NETWORK WORLD
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MCI weighs services for ACD nets

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. last week revealed that it will roll out a service to help users manage automatic call distribution (ACD) networks and may eventually offer an ACD service based on equipment housed in its network.

At a technical briefing here, MCI officials said the carrier's new Intelligent Routing Capability (IRC) service will make it easier for users to manage and interconnect their ACDs.

MCI will monitor incoming call traffic and poll individual ACDs — through Common Channel Signaling System 7 or Integrated Services Digital Network links — to identify overloaded ACDs and automatically reroute calls to other ACDs.

The service could be available as early as next year.

In addition, the carrier is exploring the possibility of rolling out Network ACD, a service that would enable users to set up an ACD network using equipment owned and maintained by MCI. That would free users from purchasing and maintaining ACD equipment at their own sites.

Observers said the service

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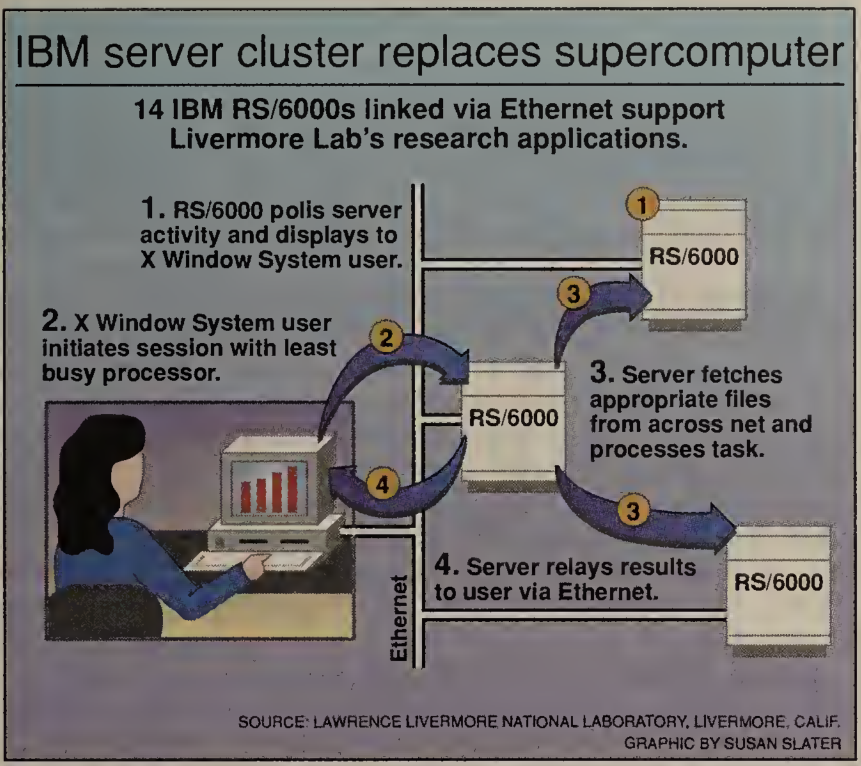

IBM server cluster replaces supercomputer

14 IBM RS/6000s linked via Ethernet support Livermore Lab's research applications.

1. RS/6000 polls server activity and displays to X Window System user.
2. X Window System user initiates session with least busy processor.
3. Server fetches appropriate files from across net and processes task.
4. Server relays results to user via Ethernet.
RS/6000
RS/6000
RS/6000
Ethernet
1
2
3
3
4

SOURCE: LAWRENCE LIVERMORE NATIONAL LABORATORY, LIVERMORE, CALIF.
GRAPHIC BY SUSAN SLATER

User replaces Cray XMP with network of RS/6000s

By Joanne Cummings
Staff Writer

LIVERMORE, Calif. — The University of California's Lawrence Livermore National Laboratory last week said it has awarded IBM a $1 million contract to replace a Cray Research, Inc. XMP supercomputer here with a networked cluster of IBM RISC System/6000 servers.

Livermore Lab is counting on the networked server cluster to deliver the same level of performance as the quad-processor Cray XMP at a fraction of the cost of purchasing a supercomputer to replace the loaner unit it returned to another lab.

IBM will supply Livermore Lab with 14 RS/6000 POWERserver 550s. Together, the devices will form Livermore Lab's Open Computer Facility Unix Compute Server and provide users with 2.9G bytes of memory capacity vs. the Cray XMP's 64M bytes.

The lab needs the increased memory capacity to support user applications that the Cray, which was a relatively low-end supercomputer, had not been able to handle in the past, said Eugene

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Hughes LAN Systems preps powerful hub

Enters market with multibus, 2G bit/sec box that will support Ethernet, token-ring and FDDI nets.

By Maureen Molloy
Staff Writer

MOUNTAIN VIEW, Calif. — Hughes LAN Systems, Inc. will enter the local-area network hub market next week with the introduction of a third-generation hub with integrated bridging/routing functions and an aggregate bus capacity of 2G bit/sec.

The top-of-the-line Enterprise Hub has 11 buses and can support modules for 10Base-T unshielded twisted-pair Ethernet, token-ring nets, 100M bit/sec Fiber Distributed Data Interface LANs and synchronous and asynchronous terminal servers.

It is one of three hubs to be introduced by the company. Each will support Simple Network Management Protocol agents on every module and be offered with a new proprietary net management system called Monet.

"Hughes' approach is to build as powerful and as functional a hub as possible," said Todd Dagres, director of data communications research at The Yankee Group, a Boston-based consultancy. "It has maximum performance, throughput and management capabilities but will initially lack the support for all LAN environments. "They're focusing now on the scale of the hub and will eventually increase its scope, whereas competing vendors cur-

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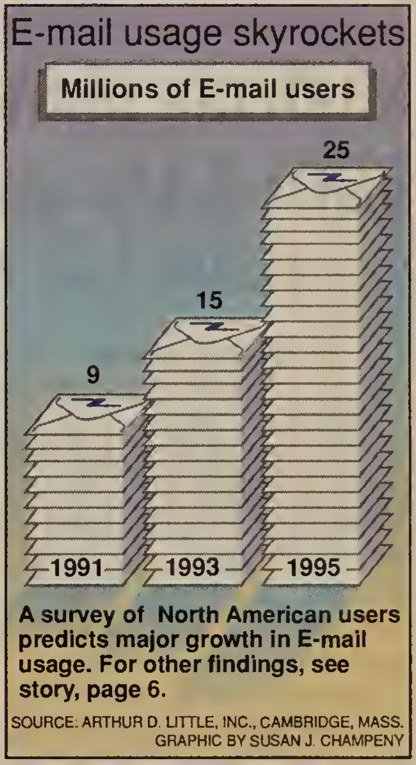

E-mail usage skyrockets

A survey of North American users predicts major growth in E-mail usage. For other findings, see story, page 6.

SOURCE: ARTHUR D. LITTLE, INC., CAMBRIDGE, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Client/server pays off for Conn. Mutual

By Paul Desmond
Senior Editor

HARTFORD, Conn. — Connecticut Mutual Life Insurance Co. has gained an edge in service and productivity by redesigning business processes and building a client/server computing architecture that gives users seamless access to multiple data sources.

The firm has developed what it calls the Command Center, which is a token ring-attached IBM Personal System/2 running Microsoft Corp. Windows 3.0 and other software tools that provide access to more than two dozen host applications and a Unix-based image system in addition to supporting local applications.

Connecticut Mutual has rolled out 600 such Command Centers, each designed to present data tai-

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NETLINE

WELLFLEET GIVES ROUTER features that ease control of frame relay nets. Page 4.

USERS TRUMPET MERITS of new E-mail-enabled applications. Page 4.

HP, IBM UNLEASH E-mail barrage at electronic mail conference. Page 4.

TI TO OFFER HOMEGROWN EDI products. Page 4.

DEC PACKAGES NAS software at considerable savings over component prices. Page 6.

OBJECT GROUP MAPS future for development of distributed applications. Page 6.

US SPRINT PRESSES Federal Reserve to join the ranks of FTS 2000 users. Page 71.

NEWSPAPER

INSIDE FEATURES

Lack of tools slows network application development tasks

Client/server and distributed processing architectures hold promise for users looking to build networked applications. But a lack of development tools keeps the promise from becoming a reality. See page 45.

Vendor forum work brings users closer to benefits of X.500

The benefits of X.500 are coming within sight of users, thanks to the North American Directory Forum's plans to interconnect public E-mail directories. See page 51.

Proteon off-loads net tasks from PCs to net interfaces

Firm unveils software to free limited DOS memory for applications, improves PC's performance.

By Maureen Molloy
Staff Writer

WESTBOROUGH, Mass. — Proteon, Inc. last week unveiled new software for its ProNet line of token-ring interfaces that enables users to off-load communications processes from DOS-based workstations to the intelligent adapters.

By distributing network tasks down to the adapter, users can increase workstation performance by alleviating random-access memory bottlenecks. They can also conserve up to 63% of a DOS-based personal computer's memory to support client/server and other emerging applications.

Proteon announced its ProNet-4/16 Advanced Software Architecture (ASA), which consists of five software modules — including device drivers, network management agents and protocol stacks — for use with its Industry Standard Architecture, Micro Channel Architecture and Extended Industry Standard Architecture token-ring boards.

"Until now, the processing power of the adapter has been underutilized," said Carl Blume, Proteon's senior product manager. "With ASA, we've exploited the hardware capability of the adapter so programs can be executed where it is most efficient."

Although Proteon intends to

(continued on page 70)

Students plan bridge to link FDDI LANs over SMDS nets

PacBell to test device in SMDS trial next year.

By Joanne Cummings
Staff Writer

BERKELEY, Calif. — A group of graduate students at the University of California, Berkeley is developing a bridge designed to link FDDI nets over public Switched Multimegabit Data Service (SMDS) networks at speeds up to 155M bit/sec.

Based on a media access control (MAC) chip developed by the group, Bay Bridge will be the first remote bridge to run at such high speeds and fully comply with the ANSI X3T9.5 Fiber Distributed Data Interface standard and the SMDS technical reference, said My Le, a graduate student at the school.

Le said the bridge should be completed by year end, and after some preliminary testing, it will be deployed in an SMDS field trial with Pacific Bell, a significant financial and technical contributor to the project.

Because the bridge is being developed at the university using research grants and equipment, it is unclear when a commercial product will be introduced.

Bay Bridge is a stand-alone unit about the size of a small pizza box. It comes with a single local port to connect to an FDDI net and a single wide-area port to connect to the public network.

The bridge uses the Spanning

(continued on page 8)

WilTel airs plans to enter switched voice service mart

By Bob Wallace
Senior Editor

TULSA, Okla. — WilTel last week announced a conditional agreement to acquire Telesphere Communications, Inc., a bankrupt national carrier whose network it will use to enter the market for switched voice services nationwide.

The acquisition would give WilTel a customer base that spends $300 million to $400 million a year on long-haul services, a national switched voice net and the ability to provide custom net packages consisting of switched and private-line services.

"We're having extreme difficulties competing with the Big Three, who are offering our large users custom packages in which switched and private-line services are bundled," said WilTel President Roy Wilkens.

"These users are telling us that, although our private lines are cheaper, they can get bigger discounts by including 800 and 1+ services in custom arrangements."

In August, WilTel told the Federal Communications Commission that it has lost 10% of its business due to customers switch-

(continued on page 68)

Briefs

Flood knocks out Comdisco hot site. Comdisco, Inc. suffered a major embarrassment last week when a flood knocked out the company's electronic vaulting and disaster recovery facilities in Carlstadt, N.J. A severe storm caused flooding that crippled a transformer handling power feeds from two grids, according to John Jackson, executive vice-president of Comdisco Disaster Recovery Services, Inc. Power was out for most of Thursday. Sea-Land Service, Inc., a major shipping firm, lost all electronic vaulting services for a day and was unable to conduct a major test of its disaster recovery capabilities planned for the weekend, said Emiel Trombetti, Sea-Land's disaster recovery manager.

Retix leads directory charge. Retix last week announced it will create a directory synchronization specification to allow disparate electronic mail systems to receive updates and share information on directory names. Digital Equipment Corp., Pacific Bell, Soft-Switch, Inc. and Sprint International said they would support the specification, called Directory Exchange, when it becomes available. No release date for the specification has been set yet.

Caller ID law moves forward. Sen. Herb Kohl's (D-Wisc.) bill, S. 652, "The Telephone Privacy Act of 1991," which legalizes caller identification, was passed by the Senate Judiciary Committee last week but was changed in the process.

New provisions added to the bill clarify that caller ID is not only legal on the federal level, but also in states, such as Pennsylvania, that have declared it illegal. The bill calls for per-call blocking, but in a compromise with states and industry, will now grandfather all state laws and regulations authorizing per-line blocking as well. Another addition prohibits 800 and 900 services from selling, reusing or disclosing numbers or information obtained through caller ID. The bill, which also exempts private networks from the blocking requirement, will now go to the Senate floor for a vote.

US West launches switched 56K. US West Communications, Inc. last week announced a switched 56K bit/sec offering, dubbed Switched Data Service (SDS), that, when used in conjunction with similar services from long-haul carriers, will enable users to build end-to-end switched digital links. SDS will be available in US West's 14-state region beginning Nov. 10 and cost interexchange carriers three cents a minute for each end of a circuit.

Cable & Wireless adds VNS. As expected, Cable & Wireless Communications, Inc. last week introduced a virtual voice network service targeted at companies that spend between $500 and $50,000 a month on long distance. Dubbed Virtual Network Service (VNS), the offering is accessible in 130 U.S. cities and combines domestic, international, 800 and travel card services under one product umbrella.

All usage is combined under a single volume discount plan. VNS offers special discounts for on-network calling and for frequently called domestic area codes and foreign countries ("Cable & Wireless takes on Big Three on virtual network front," *NW*, Oct. 28). Companies can receive a single bill for all locations or have locations billed separately.

FTS 2000 carriers will cap prices. The General Services Administration last week announced that it has reached an agreement with AT&T and US Sprint Communications Co., the two Federal Telecommunications System (FTS) 2000 vendors, on a publicly available price cap for data transmission service.

The GSA said it also expected to reach a price cap agreement for switched voice service within a few weeks. The cap formula provides an agreed-upon method to automatically adjust FTS 2000 prices to meet AT&T's and US Sprint's commercially available rates.

Bellcore accused of overcharging. An audit compiled by the National Association of Regulatory Utility Commissioners and circulated to the media last week claims that Bell Communications Research overcharged the regional Bell holding companies by $79.8 million between 1984 and 1990. Bellcore said it strongly disagrees with the findings of the audit, which was prepared by state regulators and the Federal Communications Commission. The audit will be presented to state regulators at a meeting this month.

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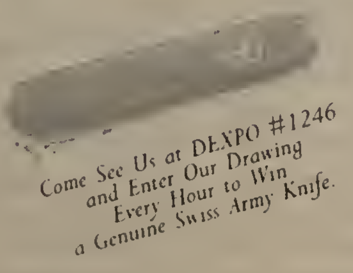
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Wellfleet routers get new frame relay capabilities

Features ease management of frame relay nets.

By Maureen Molloy
Staff Writer

BEDFORD, Mass. — Wellfleet Communications, Inc. last week announced that it has incorporated three new features into the Frame Relay Interface for its multiprotocol bridge/routers that will simplify management of frame relay nets.

The features, based on standards that have been proposed to the Internet Engineering Task Force (IETF), would enable multiprotocol routers from various vendors to communicate over frame relay networks, ease the addition of new nodes to a network and provide Simple Network Management Protocol (SNMP) support of the frame relay interface.

Wellfleet rival Cisco Systems, Inc. currently supports two of the IETF specifications.

Support for the Multiprotocol Interconnect over Frame Relay specification will enable Wellfleet multiprotocol routers to work with similar devices from other vendors across a frame relay network. Existing frame relay specifications do not cover router-to-router communications, but focus mainly on communication between devices and frame relay switches.

Multiprotocol Interconnect over Frame Relay defines two options for encapsulating multiprotocol traffic for transmission across a frame relay link. One is the Network Level Protocol ID, an encapsulation method used for Open Systems Interconnection and Transmission Control Protocol/Internet Protocol data.

The second encapsulation method is the Sub Network Access Protocol, an IEEE standard used for protocols such as Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet and Novell, Inc.'s Internetwork Packet Exchange (IPX).

> Inverse ARP, together with Annex D, the newly adopted ANSI standard for managing a frame relay network, allows each new node to announce its address and support self-configuring networks.

▲▲▲

By supporting the specification, Wellfleet's multiprotocol router will be able to transmit TCP/IP, DECnet, Xerox Corp's Xerox Network Systems, IPX and AppleTalk, as well as Source Route Bridging and spanning tree bridging protocols, across a frame relay link.

Adding new nodes

Another specification Wellfleet is supporting, dubbed Inverse ARP, is a derivative of the ARP protocol used in TCP/IP and AppleTalk networks to simplify the addition of new nodes to an internetwork.

Frame relay nodes currently can broadcast information about the addition of new permanent virtual circuits but not a protocol address. This makes it difficult for existing nodes to communicate with new nodes added to the network.

Inverse ARP, together with Annex D, the newly adopted ANSI standard for managing a frame relay network, allows each new node to announce its address and support self-configuring networks.

Wellfleet's frame relay interface will also support the Frame Relay MIB specification, which enables the interface to be managed by an SNMP management station.

The Management Information Base defines the number of frame relay variables to be managed. These are grouped into three general categories: Data Link Connection Management Interface, circuits and errors.

All three features should be available by year end.

HP, IBM unwrap E-mail tools at EMA conference

By Bob Brown
Senior Editor

NEW ORLEANS — Hewlett-Packard Co. and IBM used the Electronic Mail Association's annual conference here last week to unveil new X.400-related products, as well as other E-mail tools and enhancements.

HP boosted its X.400-based E-mail backbone products, which run on servers and link multiple E-mail nets via X.400, with connectivity to local-area network-based E-mail systems, and announced commercial availability of its X.500 directory services as well as new E-mail management capabilities.

HP signed an agreement with Touch Communications, Inc., a Campbell, Calif.-based maker of Open Systems Interconnection software, under which Touch will develop gateways that tie LAN-based E-mail systems to HP X.400 backbones.

Touch will port its Worldtalk personal computer E-mail gateway software to the HP 9000 computer system and integrate it with the HP 9000-based X.400 software.

Two initial Touch gateways will provide connections from the HP X.400 system to users on Microsoft Corp.'s Microsoft Mail for Apple Computer, Inc.'s Macintoshes and Lotus Development Corp.'s cc:Mail. HP will also work with Touch to develop gateways enabling other LAN E-mail systems to communicate with the HP X.400 backbone, said Mikael Johansson, OSI marketing program manager for HP's Information Networks Division in Cupertino, Calif.

Touch's Worldtalk gateways are scheduled to be available in January and will be priced from $8,000 to $24,000.

HP also announced plans to upgrade its OpenView network management system to provide centralized fault and operations management of HP's X.400-based backbones in the first half of next year. Under this plan, the servers running the X.400 software will be considered managed objects under OpenView, Johansson said.

In addition, HP said its X.500 Distributed Directory software will be commercially available in January. The software, which has been in pilot tests with 13 customers to date, is designed to make it easier for users to locate addresses across E-mail net-

(continued on page 71)

Users herald benefits of mail-enabled applications

By Bob Brown
Senior Editor

NEW ORLEANS — Electronic mail users at the Electronic Messaging '91 annual conference held here last week trumpeted the merits of developing so-called mail-enabled applications.

Users said moving beyond simple interpersonal messaging to develop applications with embedded E-mail services has enabled them to reduce manual labor, cut costs and speed business processes, such as the routing and approval of reports.

During presentations to attendees and in subsequent interviews, users drove home the message that mail-enabled applications provide clear-cut business benefits.

Patrick Adkisson, Information Express manager at Nordstrom, Inc., a Seattle-based retailer, said the company has been running several mail-enabled applications since June under a new messaging program called Vendor Information Partnership (VIP) Express.

The VIP Express program enables Nordstrom's 27,000 suppliers to communicate with the retail giant via MCI Communications Corp.'s MCI Mail service.

The first two mail-enabled applications Nordstrom implemented under its VIP Express program enable suppliers to request information from the company's IBM 3090-based database regarding the status of purchase orders and invoices, Adkisson said.

Suppliers often need to check the status of purchase orders, for instance, because Nordstrom gives them a window of time — which is subject to change — in which to deliver the order, according to Adkisson. The firm requires the supplier to take back the merchandise if the order is late.

To check the status of a purchase order, the supplier fills out a preformatted inquiry form and sends it via MCI Communications Corp.'s MCI Mail to a mail gateway at Nordstrom, Adkisson said. The inquiry form is then routed over the Computer Associates International, Inc. CA eMail+ internal E-mail net to the database, where a CICS transaction is triggered to locate the requested data.

The data is then sent back to the gateway, which reformats it and transmits it to the supplier via MCI Mail, Adkisson said.

The entire process typically takes less than 10 minutes, far more efficient than the manual process, which often consumed hours or even days, he said.

Suppliers using the system have cut the number of orders refused due to untimely deliveries by between 60% and 80%. They have also saved an untold amount of money in freight costs related to shipping merchandise back after an order had been refused, he added.

So far, Nordstrom has signed up 235 suppliers for VIP Express and hopes to have 2,000 suppliers on the system by the end of

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TI to market homegrown EDI products

By Wayne Eckerson
Senior Editor

DALLAS — One of the premier users of electronic data interchange, Texas Instruments, Inc., is trying to cash in on its EDI expertise by offering its technology to other users.

The $6 billion electronics firm last week announced that it will begin selling this month a set of EDI products that were developed for internal use. The products include a communications gateway, translation software, an EDI management system, mapping program and test facility.

TI will sell the EDI products through its Information Technology Group, which recently began marketing internal systems distinguished as best-of-class products by other users, according to Ken Shoquist, manager of procurement and EDI systems at TI.

Besides EDI products, the group is selling a version of TI's electronic procurement system.

Most of the EDI products offered by TI were developed in the mid-1980s to support its far-reaching EDI program, which now boasts more than 1,700 trading partners in 20 countries. The company processes 11,000 EDI documents a month.

The communications gateway runs in an IBM MVS environment and supports a variety of protocols, including asynchronous, bisynchronous (2780/3780), Kermit, X.25, Synchronous Data Link Control, LU 6.2, X.400 and IBM Systems Network Architecture (3770). It also supports interfaces to a number of host environments, including batch, CICS, IMS, TSO and MVS.

The gateway supports store-and-forward and real-time processing, and can operate in a multiprocessor environment, which significantly increases throughput, Shoquist said. It also uses artificial intelligence to spot errors in any outgoing transmission and will automatically correct the error and resend the message.

TI's translation software, which also runs on an IBM MVS mainframe, supports almost every EDI standard format in existence, including X12 and EDI for Administration, Commerce and Transport (EDIFACT), an emerging international EDI standard.

The translator takes incoming transmissions and converts them to the appropriate application formats. It converts outgoing messages into the proper EDI format for transmission to a trading

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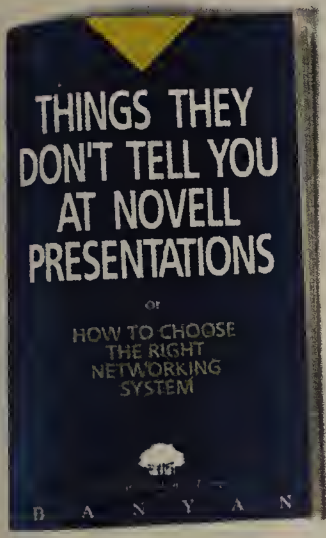
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Bill to revamp federal IS purchases draws GSA ire

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — A House bill proposing sweeping changes in the federal regulations governing computer and network purchases drew protests last week from the General Services Administration but picked up key Senate support.

The GSA currently oversees the Federal Telecommunications System (FTS) 2000 network and is the central authority approving $20 billion annually in data processing purchases by other agencies. Under the proposed legislation, the agency would be stripped of its permanent procurement authorization and become subject to annual budget approval by Congress.

At a House hearing on H.R. 3161, dubbed the Federal Property and Administrative Services Authorization Act of 1991, GSA Administrator Richard Austin said giving Congress line-item scrutiny of the GSA would jeopardize its ability to buy for other agencies and imperil existing multiyear contracts.

Austin also objected to a provision of the bill requiring that at least 75% of senior executive service appointments within the GSA be filled with persons possessing at least five years of civil service experience.

Austin said the administration already meets that 75% requirement but objected because "it suggests that the appointment of executive branch employees would be subject to review or disapproval by a committee of Congress."

Rep. John Conyers (D-Mich.), head of the Government Operations Committee and author of the bill, brushed aside the criticism, emphasizing the need for oversight of the agency's automatic data processing (ADP) and telecommunications procurements.

Armed with a General Accounting Office (GAO) report that criticized the GSA for sloppy record keeping and an understaffed ADP review group, Conyers said, "The GSA's time has come. They're going to get on the treadmill along with everybody else and be reviewed by Congress. We do everybody but [the GSA], and it isn't going to hurt."

At the hearing, Nye Stevens, GAO director of government business operations issues, pointed out that the GSA does not rely on funds appropriated by Congress to operate.

"The majority of the GSA's operating funds are generated from charging agencies the cost, plus markup, for goods and services,"

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Major study mulls future for E-mail

By Heidi Bomengen and Walter Ulrich
Special to NW

NEW ORLEANS — The Electronic Mail Association (EMA) last week released results of a major user study that predicts a

ANALYSIS

dramatic increase in E-mail usage and highlights the challenges users will face in designing appropriate E-mail policies and architectures for the future.

Based on research of North American companies with at least $500 million in annual revenue, the EMA predicts that E-mail usage will nearly triple by 1995.

The study, conducted by EMA's Research and Statistics Committee, shows that nine million employees within these companies currently use E-mail and that figure could rise to as many as 25 million users by mid-decade.

By 1995, these companies may be transmitting nearly 15 billion E-mail messages a year.

The EMA conducted nearly 2,000 interviews at the headquarters and branch office locations of these companies. The findings show that firms currently using E-mail expect to add an average of 23% more users each year and some 25,000 new sites are considering implementing E-mail within the next two years.

The survey found that 42% of headquarter sites use E-mail, as do a third of branch sites. Forty-five percent of employees at those headquarter sites use E-mail, while only 26% of employees at those branches use E-mail.

However, that differential in usage is likely to change rapidly. Respondents at headquarter sites predict a 38% increase in E-mail usage next year, while respondents in branch offices expect an 80% increase in usage.

The survey shows that almost half of all messages originating at headquarters are destined for another location, while more than 80% of the messages originating from branch locations are destined for headquarters, other branches or another firm.

Today, only about 5% of electronic messages from headquarters and 3% from branch locations are sent to another company. But intercompany traffic is likely to increase quickly as tech-

(continued on page 8)

OMG unveils key tool for distributed applications

By Jim Duffy
Senior Editor

NEW YORK — The Object Management Group (OMG) last week mapped out the road to the future of the information age with the unveiling of software that will make it easier for users to build distributed applications.

As expected, OMG, a vendor consortium, unveiled its Object Request Broker, software that enables object-oriented applications to exchange messages or invoke procedures on other machines via remote procedure calls (RPC). The broker, which resides on networked client computers, receives requests from object-oriented applications, locates that data and issues calls to transmit it to the user ("OMG to release network architecture component," *NW,* Oct. 28).

The broker comprises technology and expertise from a number of major companies, including Digital Equipment Corp., Hewlett-Packard Co., HyperDesk Corp., NCR Corp., Object Design, Inc. and SunSoft.

Its development was hailed by the OMG as a milestone in computer networking.

"Today, we are announcing a path that leads to a new information flow," said OMG President Chris Stone. "Object technology is opening this new road. This is a significant step toward the future of truly distributed applications."

Users agreed. "This is significant because we've made a decision to deliver distributed services via objects," said Jeff Hartigan, managing director of strategic technical services at American Airlines, Inc.'s SABRE Computer Services. "We need some mechanism for managing connections in a distributed environment as seamlessly as possible."

"This is something we are very interested in," added John DiNovo, consultant for distributed processing applications at American Airlines.

According to analysts, the broker's time had come.

"You can't sustain pure file-transfer approaches to distribut-

(continued on page 68)

DEC bundles NAS tools for key platforms, eases prices

Offers packages for range of environments at costs up to 50% below component pricing.

By Jim Duffy
Senior Editor

MAYNARD, MASS. — Digital Equipment Corp. last week announced packaged versions of software available under its Network Application Support (NAS) architecture that are targeted at specific computing environments and offered at prices up to 50% below component prices.

The server-based tiers of NAS software are intended to address work group, distributed and transaction processing environments, DEC said.

NAS is a set of software tools and programming standards enabling developers to build distributed applications that can run across various systems, including VAXes, Unix-based workstations, Apple Computer, Inc. Macintoshes and microcomputers running MS-DOS, OS/2 or Microsoft Corp. Windows.

"From a customer perspective, this is to simplify the implementation of open systems," said Dennis Phelan, DEC's NAS strategic marketing manager. "This is a direct reponse to customers saying, 'Make it easier and target specific environments.' "

New pricing strategy

Users can save as much as 50% on NAS software for VMS systems and 15% on Ultrix system software by purchasing the software bundled, Phelan said. However, DEC will continue to offer NAS software as a separate product.

Analysts said the new pricing strategy brings NAS computing more in line with the industry norm. "You can now buy a basic office environment at a price you'd expect to pay for a basic office environment," said Mark LaRow, a senior manager at Ernst & Young in Vienna, Va. "The cost of VAX computing had been way out of line with PC networks."

The server packages are the NAS 200, 300 and 400.

NAS 200 for VMS and Ultrix servers is targeted at work group environments. It provides print, file and data sharing for local-area network-attached personal computers and Macintoshes, as well as Unix and VMS workstations. Client/server communications takes place via DEC's DECnet, Open Systems Interconnection, Transmission Control Protocol/Internet Protocol and Apple's AppleTalk.

NAS 200 provides access to SQL databases, including DEC's Pathworks server software, and incorporates DEC's Distributed Naming Service, which provides a single naming scheme throughout the heterogeneous environment, and the Distributed Time Service, which synchronizes all clocks on the network.

Both services are components of the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment.

NAS 200 for VAX under VMS costs $1,120 to $16,180, depending on configuration. NAS 200 for Ultrix is priced from $2,720 to $4,730. They will ship this month.

NAS 300 for VMS and Ultrix servers is intended for distributed computing environments. It features everything included in NAS 200 while adding the OSF/Motif user interface and support for X.400 messaging standards.

Both the Ultrix and VMS versions of NAS 300 incorporate DEC's DECmessageQ for exchanging messages between applications, Compound Document Architecture for sharing revisable text, graphics, images, tables and other data, and the object-oriented Application Control Architecture Services, which allow users to integrate independently developed applications in mixed computing environments.

But only the VMS version will have DEC's DECforms, which lets applications access and distribute forms to and from users in a structured format, and its All-In-1 Mail Server for sending, receiving and forwarding mail throughout a network using X.400.

NAS 300 for VAX under VMS ranges in price from $3,290 to $43,300, while the Ultrix version costs from $4,610 to $7,480. They are both expected to ship this month.

NAS 400 for VMS is customized for transaction processing environments. It includes the NAS 200 and 300 product suites for VMS but adds DEC's Applications Control and Management Systems, a transaction processing monitor for ensuring optimal application performance, availability and distribution in on-line transaction processing environments; VAXcluster software; DEC Performance Solution Data Collector for gathering and managing system data; and DEC's DECtrace VMS for collecting work load and performance information for database and application design. NAS 400 is priced between $8,150 and $128,300 and will begin shipping in January.

DEC also announced NAS 250 for VAXstation clients, a product that provides the tools to integrate VAXstations into a distributed client/server environment.

NAS 250 will ship this month as a standard component of new VAXstation 4000s.

Hughes LAN Systems preps powerful hub

continued from page 1

rently have the scope and they're working to increase scale," Dagres added.

Wellfleet Communications, Inc. introduced a 1G bit/sec router in September, and SynOptics Communications, Inc., Cisco Systems, Inc. and SunConnect, a business unit of Sun Microsystems, Inc., recently announced plans to jointly develop the RubSystem, a high-capacity integrated hub/router that is expected to debut in 1993.

Hub architecture

Hughes will offer three sizes of hubs in the Enterprise line, including a a 14-slot chassis, a box with five slots and a single-slot chassis for small work groups.

The top-of-the-line box — the only one scheduled to ship this year — will have a backplane architecture consisting of three token-ring, three Ethernet and two Fiber Distributed Data Interface buses. It will also have an 800M bit/sec synchronous bus and asynchronous bus, as well as a bus used for system administration.

In addition to the multiple buses, the hub will come equipped with other high-availability features such as redundant power supplies with load sharing and the ability to support redundant hub-to-hub links. Modules can be swapped without taking the hub down.

Module releases

The first interface modules to be offered when the hub ships in the fourth quarter will be for 10Base-T Ethernet connections over unshielded twisted pair. Hughes will offer a 24-port 10Base-T concentrator with two 50-pin telephone company connectors and a 12-port concentrator with 12 RJ-45 connectors.

Hughes will also offer an eight-port fiber-optic inter repeater link (FOIRL) concentrator for point-to-point links between Ethernet LANs.

In the first quarter of 1992, the company will roll out the five-slot chassis and:

- 16-port terminal servers for the asynchronous and synchronous buses that will offer a choice of RJ-45 or 50-pin telephone company connectors and expandable memory to 8M bytes, as well as support the Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Local Area Transport terminal protocol, the serial line interface protocol and SNMP.
- A multiport local Ethernet bridge spanning the three Ethernet backplane buses and offering one external Ethernet connection.
- A remote Ethernet bridge connecting one backplane bus to a high-speed serial port and frame relay software as an option.
- A token bus bridge.

Future releases

Beginning in the second quarter of next year, Hughes plans to add FDDI concentrators and bridges, router modules, token-ring media access units and bridges, optical hub-to-hub links and the stand-alone version of the hub.

In terms of 10Base-T port capacity, the 14-slot chassis will be able to support a maximum of 336 ports, while the 5-slot box will support 120 and the stand-alone unit will support 24 ports.

Each module in the hub will come with an SNMP agent that can be controlled by a central SNMP network management station. This will make it possible to collect port-level data such as performance statistics as well as set thresholds and configuration parameters. Providing network monitoring down to the module level is an important achievement, analysts said.

> "This is the first hub vendor to design standards-based network management into every modular piece of the hub."
>
> ▲▲▲

"This is the first hub vendor to design standards-based network management into every modular piece of the hub," said Michael Howard, president of Infonetics Research, Inc., a San Jose-based consultancy. "This is a harbinger of future products."

In addition to SNMP management, the hub will also come equipped with Hughes' proprietary net management system, Monet, which will provide a graphical display of the hub at the chassis, module and port levels.

It will also provide comprehensive configuration management including port address tracking and color-coded fault reporting.

"Users want high-speed routing and bridging available in a high-speed hub. This makes the deployment of internetworks much easier to design and manage when all the functionality is stored in a single box."

Pricing for the new hubs was not available. ◘

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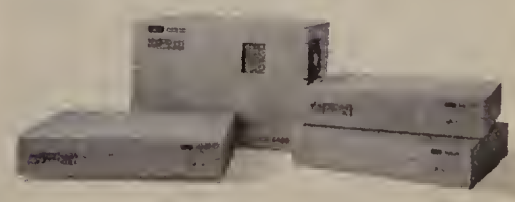

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Students plan bridge to link FDDI LANs

continued from page 2

Tree Protocol (STP) and can forward packets at speeds up to 100K packet/sec. According to Le, it is designed as an encapsulating remote bridge. The bridge can be managed from a Sun Microsystems, Inc. SPARCstation, enabling users to set bridge thresholds and monitor conditions.

Inside the unit, three boards are interconnected via a 32-bit bus. The bridge unit contains a primary bridge board, an SMDS board set and an FDDI board.

Data enters the bridge through the unit's FDDI board. That board, based on an Advanced Micro Devices, Inc. FDDI Supernet chipset, controls access to the FDDI ring and buffers packets between the FDDI board and the bridge board. It also filters all FDDI addresses on the net and provides those addresses to the bridge board for building the address table.

Data is then relayed to the primary bridge board, which filters and forwards net packets to an attached SMDS board that sends them over the public net to the remote FDDI local-area network. The bridge board is responsible for building a consistent net topology, which it learns from the Spanning Tree Algorithm software running on the SPARCstation.

The SMDS interface consists of two boards, an SMDS interface and the Segmentation and Reassembly (SAR) board. The SAR board segments outgoing SMDS data it receives from the bridge board and passes it to the SMDS board for transmission over the public net. It also accepts incoming SMDS message segments from the SMDS board and reassembles them, forwarding them to the bridge board.

MAC chip

The SMDS board uses the group's MAC chip, providing the necessary throughput to link to an SMDS service. It also signals the SMDS carrier to establish a call. The board supports DS3 or Synchronous Optical Network (SONET) rates and offers a single local attachment to an SMDS network, via a coaxial cable link supporting T-3 speeds or a single- or dual-mode fiber for SONET speeds.

The Bay Bridge unit is attached via a ribbon cable to a host interface residing on the SPARCstation acting as a management console.

The SPARCstation runs STP software, network management agent software and FDDI station management software that enables a net manager to set local and remote node addresses as well as monitor network performance parameters.

Le said the students were able to develop the bridge quickly — work began in October 1990 — because they didn't have a lot of business pressures.

"We started out fresh with no customer or product line to support," she said. "And we also love what we're doing. When you're doing what you like, things go much faster." ◻

Major study mulls future for E-mail

continued from page 6

nologies like X.400 and X.500 are widely deployed.

The combined effect of an increasing number of users and easier connectivity will spur dramatic increases in intercompany E-mail traffic.

This dramatic expansion of E-mail use presents a number of challenges and opportunities for users, who will have to pay particular attention to such things as network architecture, training and policies.

E-mail architectures will have to be flexible enough to support far more users, significantly greater message volumes and many more points of interconnection.

In addition, ease-of-use must be improved to attract users at all levels from within an organization. As the user population expands, less sophisticated and less educated users will be learning E-mail — often as their first computer application.

The low levels of training and support available in most companies today will be inadequate to support the next generation of users. In fact, training and support resources may prove to be the limiting factor in E-mail proliferation, rather than the cost of E-mail software and hardware.

Policies and procedures must be developed to guide employees and managers. E-mail privacy was a nonissue just a few years ago. But in recent years, privacy concerns have made headlines in Washington, D.C., Colorado and California. Prudent companies are developing E-mail policies and updating records management programs to account for electronic needs.

The challenge is to develop the technical infrastructure, training programs and policies necessary to support dramatic increases during the coming years. Users need to smooth the transition to electronic commerce by planning carefully, developing a practical migration schedule and implementing it diligently.

Network managers can ignore the implications of this growth and be caught under budgeted and ill-prepared. Or they can set in place the technology, training and procedures, and accelerate the benefits for their company. ◻

Bomengen is a senior member of the Arthur D. Little, Inc. telecommunications practice in Cambridge, Mass., specializing in market assessment. Ulrich is a director of Arthur D. Little based in Los Angeles and a pioneer in the E-mail industry.

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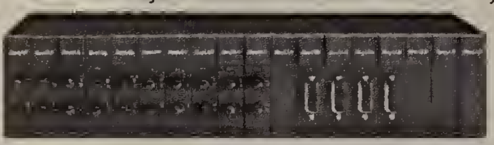

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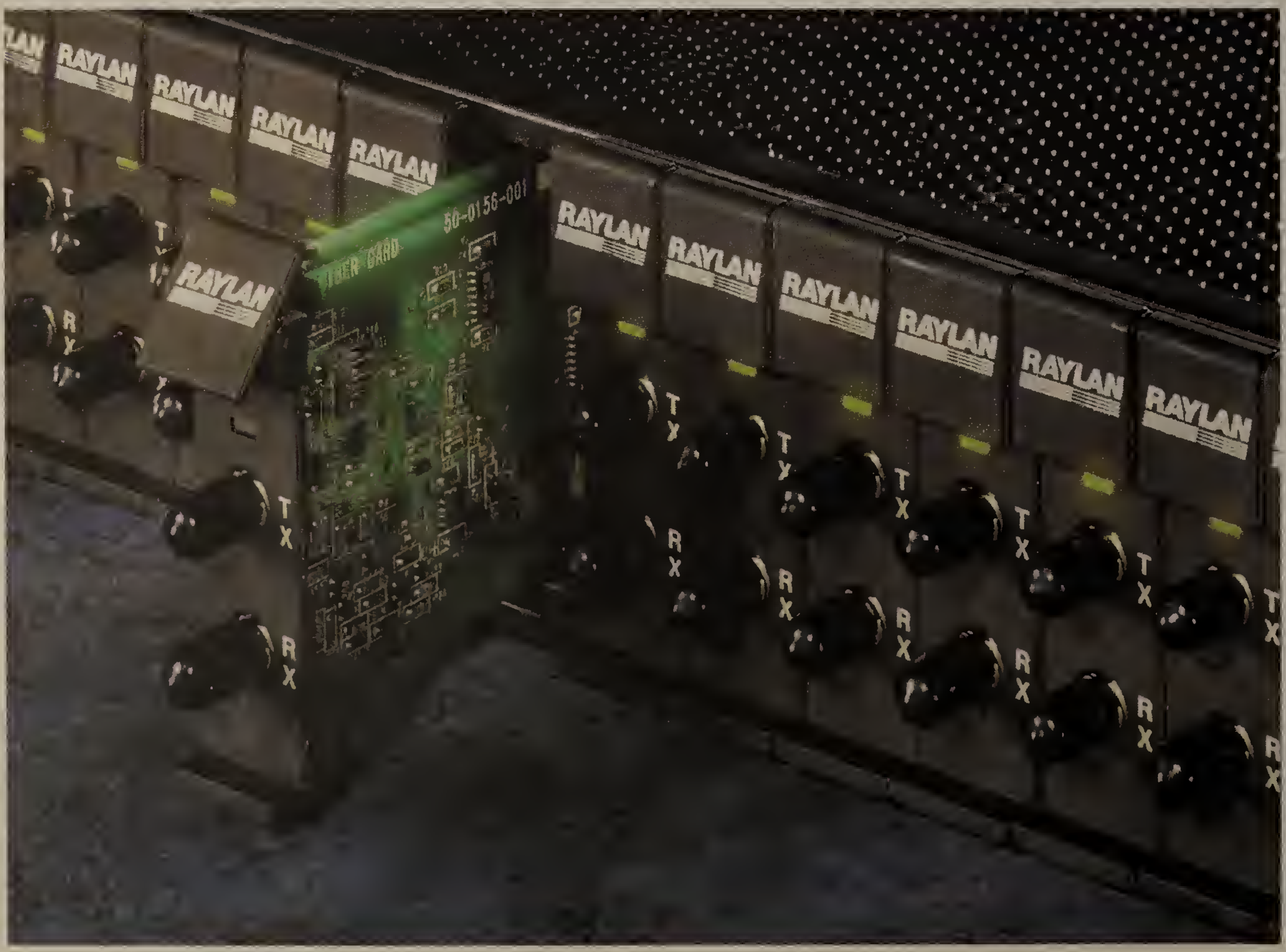


INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

> "It took me a long time to understand what [the industry] meant by open vs. proprietary, but I finally figured it out. From the perspective of any one supplier, open meant 'our products.' Proprietary meant 'everybody else's products.' "

Michael Zisman
President
Soft-Switch, Inc.
Wayne, Pa.

People & Positions

Michael Ripple, formerly director of marketing for wide-area products at **Infotron Systems Corp.,** was named director of customer service for **Gandalf Systems Corp.,** the U.S. division of Gandalf Technologies, Inc., which was formed by the recent merger of Gandalf Data, Inc. and Infotron.

Ripple will be responsible for technical service of Infotron and Gandalf networking products for U.S. customers. He will report to Gerry Chastelet, vice-president of sales, marketing and service at Gandalf Systems.

Legent Corp. recently announced that **Mario Morino,** formerly executive vice-president and general manager of the information systems management division, has been appointed vice-chairman, a new position at the company.

Morino will be responsible for working with major customers. He will report directly to Chairman and Chief Executive Officer Joe Henson, with whom he will share responsibility for strategic planning and prospective acquisitions.

Legent also announced that **Eric Noelke,** formerly in charge of vertical market con-

(continued on page 10)

ISDN forum to influence carrier's service offerings

Southwestern Bell encourages trend of user input.

By Ellen Messmer
Washington Correspondent

ST. LOUIS — Southwestern Bell Telephone Co. last week announced the formation of an Integrated Services Digital Network user and industry forum to guide the carrier in its ISDN deployment plans.

Formation of the forum, just a month after a similar organization met in California for the first time, underscores an effort by some regional carriers to work with key customers in bringing ISDN services to market.

The Southwestern Bell Telephone ISDN/Advanced Technologies Users Forum, will operate as an independent organization and is open to Southwestern Bell Telephone customers and suppliers of ISDN products and services.

The forum will address technical and tariffing issues on the local and regional levels and help users guide carriers in rolling out ISDN-related services and applications.

"They're not a puppet for Southwestern Bell," said Steve Millstein, division manager for business marketing at Southwestern Bell Telephone. "They will be partners with us."

According to Millstein, the forum emerged from customer queries about "what was happening in our company regarding ISDN and what other customers are doing [with the technology]." He added that the forum will enable the carrier to launch trial services and team on application development.

The forum will hold its first meeting Nov. 20 in Dallas.

Southwestern Bell Telephone currently provides Basic Rate Interface (BRI) and Primary Rate Interface (PRI) in only 11 cities on a nontariffed, case-by-case basis but plans to file its first tariffed ISDN offerings by the end of the year.

For users, the forum presents an opportunity to share ideas and discuss problems as well as influence the rollout of the technology, said Lew French, telecommunications manager at 3M Corp.'s Austin, Texas, office and cochairman of the forum.

3M Corp. uses both BRI and PRI for voice, data and videoconferencing applications between the laboratories and administrative offices located at its Austin and St. Paul, Minn., facilities.

French said he hoped the forum would serve as an information conduit to telecommunica-

(continued on page 10)

INDUSTRY BRIEFS

AT&T revamps communications services unit. AT&T last week said it has reorganized its Communications Services Group to improve service to users in the business and residential long-distance markets.

Under the restructuring, AT&T's International Communications Services unit, which is responsible for international calling services, will be merged into the Business and Consumer Communications units. Two divisions within the Communications Services Group — Network Services and International Operations — will support the Business and Consumer Communications units.

Victor Pelson, an AT&T group executive, will act as chief executive of the consolidated communications services operations. He said the moves "erase an organizational line between domestic and international communications services."

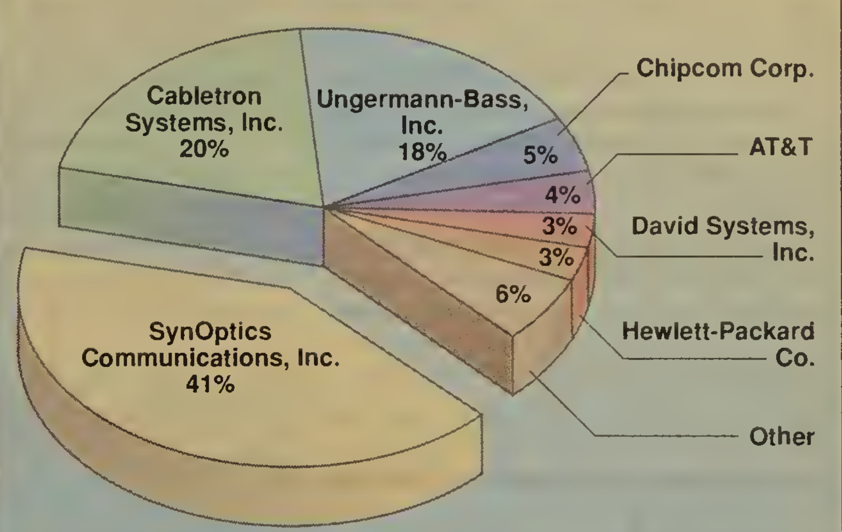
AT&T reassigned International Communications Chief John Berndt to head up the Business Services arm. He will oversee Joseph Nacchio, who will serve as president of the Business Communications Services unit. AT&T also appointed Louis Golm vice-preident of business network sales, Frank Ianna vice-president of international marketing, John Leighfield president of U.K.-based AT&T Istel and Gordon Bridge president of AT&T EasyLink Services.

Robert Ranalli, currently president of the Consumer Communications unit was named president of the Consumer Services operation with global responsibility for consumer services.

(continued on page 10)

The global smart hub market

1990 revenue total: $287 million



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: THE YANKEE GROUP, BOSTON

Competition gaining on SynOptics' lead

Revenue shortfall, decision to reduce 10Base-T prices are signs competition is gaining ground.

By Bob Brown
Senior Editor

SANTA CLARA, Calif. — Life atop the intelligent wiring hub market isn't getting any easier for SynOptics Communications, Inc., the longtime market leader.

Accustomed to runaway financial growth, SynOptics last month failed to meet analysts' earnings and revenue forecasts when the company posted its fiscal third-quarter results. A week later, the company announced plans to slash prices across its 10Base-T hub and concentrator line by as much as 50% in response to increased competition in what is rapidly becoming a commodity market.

Analysts said these are signs SynOptics may have reached its growth peak in the intelligent wiring hub market. As rivals pare pricing to commodity levels, SynOptics will have an increasingly difficult time sustaining market growth, they said.

In light of this, SynOptics is expected to become more aggressive on pricing and attempt to differentiate itself by focusing more resources on new products based on emerging technologies, such as Asynchronous Transfer Mode and Fiber Distributed Data Interface technologies.

"There was no way SynOptics was going to maintain such huge market share and growth figures," said Todd Dagres, director of data communications at The Yankee Group, a Boston-based market research firm. "But the market is still growing, and SynOptics has the opportunity to grow with it if it makes the right decisions."

SynOptics owned 41% of the $287 million smart wiring hub market last year, but Cabletron Systems, Inc., Ungermann-Bass, Inc. and a host of others are coming on strong, he said.

All those rivals have been quick to react to SynOptics's recent news. "SynOptics has been on the high end of the price range, but market pressures brought on by ourselves and others have caused it to lose momentum and rethink its pricing strategy," said Henry Nothhaft, president and chief executive officer at David Systems, Inc.

> Analysts said these are signs SynOptics may have reached its growth peak.
>
> ▲▲▲

Hurt by competition

When SynOptics posted nearly a 50% drop in earnings for last quarter ended Sept. 27 — compared to the same quarter last year — and its revenue fell 7.5% from the previous quarter, SynOptics' President and CEO Andrew Ludwick acknowledged that the company's financials were being affected by competitive pressures.

But SynOptics has attempted to respond to competition by try-

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Carrier's ISDN forum influences offerings

continued from page 9

tions manufacturers and service providers regarding user needs. Although the group will initially focus its attention on ISDN, other advanced technologies, such as frame relay, will also be topics of future discussions.

The forum's founding members include Rockwell International Corp., Shell Oil Co., Tenneco Gas Co., 3M Corp., Valero Transmission Co. and Southwestern Bell Telephone.

Within six months, the forum plans to publish a survey detailing how each of the member companies uses ISDN, French said.

Southwestern Bell Telephone's formation of an ISDN forum follows the first meeting of the California ISDN Users Forum in San Ramon, which included 200 users and vendors as well as state regulatory agencies.

> "The NIU Forum addresses national problems, but there are regional problems, such as tariffs, that need to be addressed at a local level."

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The California forum was launched by the Lawrence Livermore National Laboratory, with help from Pacific Bell.

"It's a forum for users, customer premises equipment vendors and the public utility commission to exchange information in order to bring about the rapid deployment of ISDN in California," said Steve Kluz, data communications engineer at Livermore Lab and a forum member.

The participants in the California ISDN forum include IBM, Hewlett-Packard Co., Pacific Bell, the First National Bank of Chicago, Rockwell International and the California state government.

The California ISDN forum was recently accepted as a regional chapter of the National ISDN Users (NIU) Forum.

"The NIU Forum addresses national problems, but there are regional problems, such as tariffs, that need to be addressed at a local level," Kluz said.

Individuals interested in the Southwestern Bell Telephone ISDN forum may call (800) 255-7928 for further information.

Those wanting more information on the California ISDN Users Forum may call (510) 423-7757. ◘

People & Positions

continued from page 9

sulting at Oracle Corp., has joined the company as vice-president of professional services.

In addition, **James Snediker**, formerly senior vice-president of the systems productivity division, was appointed to the new position of vice-president of product development. **David Boast**, formerly vice-president of product development, has been appointed to the new position of vice-president of client services.

Finally, **Michael Connolly**, formerly senior manager at KPMG Nolan, Norton & Co., was named director of management advisory services at Legent.

Republic Telcom Systems Corp. has named **Harry Taylor** president and chief executive officer. He succeeds Jack Lorenz, who will continue to serve as chairman of the board.

Taylor was previously senior vice-president and general manager of Telco Systems Fiberoptics Corp. and corporate officer of Telco Systems, Inc.

Republic Telcom said Taylor will hold responsibility for expanding the company's range of products and markets. ◘

Industry Briefs

continued from page 9

Novell, DRI complete merger. Novell, Inc. and Digital Research, Inc. (DRI) last week said DRI's shareholders have approved the company's merger with Novell in a stock-swap agreement.

Under the deal, outstanding DRI shares will be exchanged for three million new Novell shares and DRI will be operated as a wholly owned subsidiary of Novell.

Ray Noorda, Novell's president and chief executive officer, said the company expects DRI's graphical user interface (GUI) technology to accelerate Novell's implementation of advanced GUI capabilities within network-related products. Novell also said DRI's foreign distribution channels will prove a plus to Novell, pointing out that DRI products are sold through more than 250 vendors worldwide.

Da Vinci markets Coordinator. Da Vinci Systems Corp., a Raleigh, N.C., maker of electronic mail products, last week announced it has acquired the marketing rights to The Coordinator, Action Technologies, Inc.'s groupware product. Financial terms of the transaction were not disclosed.

The agreement also calls for Action Technologies and Da Vinci to jointly develop new products to be announced in the first quarter of next year.

The Coordinator supports work group

1975 *Launched the first U.S. public data network.* 1979 *Built the first commercial private packet network.* 1980 *Introduced the first major public e-mail service.*

1988 *Sprint completes the only nationwide 100% digital fiber optic network. Sprint awarded 40% of FTS 2000 contract.* 1989 *World's first and largest privately-owned*

management by coordinating the actions of users who collaborate on projects.

Both The Coordinator and Da Vinci eMAIL run on Novell, Inc.'s NetWare Message Handling Service messaging transport, which was originally developed by Action Technologies.

IBM, DEC join CIT group. The North American Telecommunications Association (NATA) last week announced that IBM and Digital Equipment Corp. have joined the Alliance of Computer-based Telephony Application Suppliers (ACTAS), a NATA membership council.

The ACTAS industry forum was formed to support the development of computer telephone interface standards in order to promote interoperability in marketing applications that automate transfer of caller information to computer systems.

Beyond, SoftSwitch in synch. Beyond, Inc. and SoftSwitch, Inc. last week said they formed an agreement to interoperate their respective electronic messaging offerings interoperate. The pact enables Beyond's BeyondMail users to communicate over a multivendor electronic mail network via the SoftSwitch MHS Gateway.

Beyond, which develops and markets rules-based messaging applications, is located in Cambridge, Mass. SoftSwitch, a maker of electronic messaging gateways, is based in Wayne, Pa.

AT&T adds X.400 links. AT&T EasyLink Services last week announced several new X.400 connections between its AT&T Mail network and other electronic mail nets, including CompuServe, Inc.'s CompuServe Mail.

AT&T also announced interconnections with four international E-mail networks: Brazil's Embratel STM400 service, India's Videsh Sanchar Nigam, Ltd. GEMS.400 service, Italy's Teleo S.p.A. Master400 and PTT Telecom Netherlands's Memocom400.

The X.400 connections will enable users on AT&T Mail to exchange messages with users on any of the other networks. AT&T EasyLink now has 35 X.400 connections in place throughout 22 countries. ◻

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transatlantic fiber optic cable completed. 1990 Sprint announces the first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.

Competition gaining on SynOptics' lead

continued from page 9

ing to shed its reputation as a high-priced hub supplier compared to competitors.

"As the market-share leader, we probably have kept the pricing umbrella a little too high and let [other vendors] sneak in under it," said Dave Cote, director of segment marketing at SynOptics. "So what we are trying to do is establish our presence as not only a technology and quality leader, but [as] having affordable products, too."

SynOptics will look at cutting prices across its various product lines, although highly customized products, such as network management systems, probably won't be affected, Cote said.

SynOptics' price cuts likely will not trigger a price war because the company's prices will fall in step with other vendors', not undercut them, said Shirley Hunt, networking industry analyst at Dataquest, Inc., a San Jose, Calif., market research firm. It's possible, though, that other vendors may shave pricing to keep the pressure on SynOptics, she said.

SynOptics has already shown signs of a move to aggressive pricing. In September, the vendor pleasantly surprised observers by breaking into the FDDI maket with a competitively priced set of products.

That followed an August announcement about a 25% price reduction on its 12-port Model 3307/3308 10Base-T Ethernet Host Modules that was designed to test user response. When the price cut did not pull the buyer response SynOptics had hoped for, the vendor turned around last month and cut prices across its 10Base-T product line, including a 40% decrease on the price of its Model 3307/3308 and a 38% drop on the price of its 12-port Model 2800 Workgroup Concentrator.

Those cuts were necessary because "SynOptics was getting eaten alive at the low end of the 10Base-T market," The Yankee Group's Dagres said.

SynOptics was focusing most of its attention on the high end of the market but came to realize low-end sales are also important in capturing business from midsize companies and departments of large firms that will return for more equipment down the road, he added.

Tom Erickson, a research analyst at Wessels, Arnold & Henderson, a brokerage firm in Minneapolis, said SynOptics' price cuts "were a must for SynOptics and great news for users." But SynOptics can't stop there, he said.

"SynOptics has built a company with a cost structure for proprietary products in an industry that is becoming increasingly competitive," he wrote in a recent bulletin. As such, SynOptics must focus on cutting its costs and shoring up its distribution strategy, which relies heavily on value-added resellers.

While SynOptics has several issues to address, the company's recent price cuts and disappointing financials should not cause anyone to sound a death knell for the company, Dagres said.

As long as SynOptics continues to pour ample funds into research and development and partner with other vendors — as it is doing with Cisco Systems, Inc. and Sun Microsystems, Inc.'s SunConnect unit to develop a new internetworking system called the Rubsystem — SynOptics should remain the leader in its market throughout the 1990s, he added. ◻

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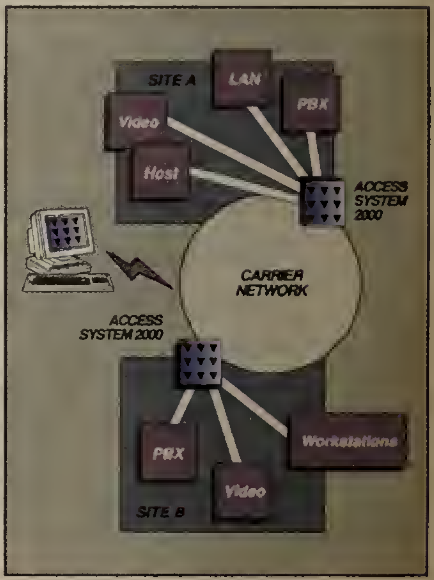

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Worth Noting

AT&T's long-distance market share is expected to slip from 68.5% in 1990 to 66.7% by year end, while MCI Communications Corp. will increase from 13.7% to 14.6% and US Sprint Communications Co.'s share will rise from 9.1% to 10.4%, according to projections by Dataquest, Inc., a San Jose, Calif., research firm.

Carrier Watch

MCI Communications Corp. last week announced it will provide a digital fiber-optic circuit linking the Olympic International Broadcasting Center in Moutiers, France, to CBS, Inc. headquarters in New York to assist in the production of the 1992 Winter Olympics.

MCI will use Newbridge Networks, Inc. multiplexers to partition the T-1 circuit into 56 compressed voice channels and seven 64K bit/sec DS0 channels. The voice channels will be linked to CBS' existing Virtual Network, allowing the company to utilize its existing seven-digit intracompany dialing plan to route calls to its locations in the U.S. The DS0 channels will support live radio broadcasts and local-area network connections.

Although installation of the T-1 will not begin until next month, CBS has already deployed a number of broadcasting specialists in Moutiers to help with the construction of the CBS Broadcast Center. CBS Sports plans to broadcast about 116 hours of coverage over 17 days in February.

AT&T last week extended the reach of its Accunet Switched 56 service to Hawaii — a move that will enable users to establish digital data

(continued on page 14)

The 1991 900 service market at a glance

Application	Percentage of calls	Revenues (in millions)	Calls (in millions)	Minutes (in millions)
Information	35.6%	$347	98	278
Entertainment	20.1	196	55	157
Messaging	11.6	113	32	90
Ordering	7.1	69	19	55
Sweepstakes	5.9	58	16	46
Fund-raising	5.4	53	15	42
Polling/surveying	3.5	34	10	27
Lead generation	2.9	28	8	23
Couponing	2.1	20	6	16
Dealer locators	1.6	16	4	12
Customer services	0.9	9	2	7
Other (including fax)	3.3	32	9	26
Total	100	975	274	779

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: STRATEGIC TELEMEDIA, NEW YORK

FCC outlines plans to move ahead with PCN services

Will sacrifice microwave user needs for new tech.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The FCC has sketched out guidelines for how it will oversee the development of personal communications network (PCN) services and resolve interference with and displacement of microwave customers that use radio frequencies earmarked for PCNs.

The Federal Communications Commission concluded at a public meeting late last month that some portion of radio spectrum in the 1.8- to 2.2-GHz band should be allocated to PCN. It is not clear how much spectrum may be devoted, but the decision will probably knock off at least some microwave users who currently utilize that frequency for private networks.

Microwave users have already protested being asked to migrate to other technologies, claiming microwave is often used in remote areas where no adequate substitute exists. They also say that changing frequencies would require writing off millions of dollars worth of existing equipment.

Despite such concerns, FCC officials appear to be so enthusiastic about PCN technology that they are willing to weather the storm. Some industry observers agree, saying that all digital, wireless PCN networks could revolutionize communications in this country by providing competition to the regional Bell holding companies.

PCNs allow users to communicate via small, wireless handsets regardless of location and, unlike traditional cellular technology, do not have to be tied into the telephone network. Experts say PCN will initially be used to carry voice, but the technology could eventually support data transmissions.

Although the FCC's decision will undoubtedly cause controversy, there are several important reasons why that spectrum has been chosen for emerging PCN services. For one, European carriers have selected the 1.8- to 2.2-GHz band, so customers could use the same handset in the U.S. and abroad if the FCC chooses a compatible spectrum. Also, some technical experts say that that spectrum is the optimum bandwidth for PCNs.

The FCC concluded some portion of the 1.8- to 2.2-GHz band be allocated to PCN.

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In an effort to sort through all of the questions being raised about PCNs, the FCC has decided to empanel an advisory committee and hold a special meeting on Dec. 5 at which industry experts will testify.

In an order released last month outlining the issues to be

(continued on page 14)

Voice response helps firm land more calls

System that automates responses to certain types of queries reduces call abandonment by 12%.

By Bob Wallace
Senior Editor

BOSTON — Boston Edison Co. has put an AT&T voice response unit to work to automate the handling of inquires about account balances, payments and meter reading schedules in an effort to reduce the number of abandoned calls.

The AT&T Conversant Voice Information System has enabled the electric company to reduce abandoned calls by 12% and has improved customer service by providing answers to customers' routine questions around the clock.

"We found that in 1987 and 1988, 17% of the people who called us hung up instead of waiting for an agent," said Phil Toledo, Boston Edison's network manager. "That was totally unacceptable." Not all customers that hung up called back later.

To address the problem, Boston Edison installed the AT&T Conversant system here at its 59-agent service center, which fields calls from the utility's 650,000 customer base.

The abandonment rate was so high and the situation so bad that the $120,000 cost of the system wasn't even a consideration in Boston Edison's decision to buy it, Toledo said. "The emphasis was on getting to customer calls quicker."

The abandonment rate was so high that the $120,000 cost wasn't even a consideration.

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Before the Conversant system was installed, customers would wait as long as six minutes to reach a Boston Edison agent. With the voice response unit, callers now wait an average of 30 seconds before they are greeted by the system. It handles 2,500 of the 22,500 calls made to the center weekly.

The firm's call abandonment rate dropped from 17% in 1988 to 8% in 1990 — the first year the

(continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

FCC approves new AT&T 800 service. AT&T last week received permission from the Federal Communications Commission to proceed with a new 800 discount program for high-volume users, dubbed 800 Guaranteed Nodal Validator. The deal will give customers discounts on 800 service if they sign up for a three-year term and commit to spending $5.5 million annually on the service.

MCI Communications Corp. had protested the offering, claiming that AT&T is attempting to lock customers into long-term commitments to reduce the number of users that can switch to other carriers once 800 numbers become portable. Currently, 800 numbers are assigned to specific carriers and users must give up their number if they switch to another carrier.

The technology necessary for 800-number portability should be in place by early 1993. MCI pointed out in arguments to the FCC that by signing up customers to a three-year deal now, AT&T would effectively prevent them from taking advantage of 800-number portability for at least 18 months after it becomes available. MCI asked the FCC to force AT&T to delete provisions in its 800 tariff that would assess penalties against users for early termination of the 800 Guaranteed Nodal Validator service.

AT&T told the FCC that MCI's claims were without merit. The

(continued on page 14)

Voice response helps firm land more calls

continued from page 13

system was on-line — to 5% this year.

"What we attempted to do with the system was to get the easy calls out of the queue," Toledo said. "These were calls that could be answered quickly."

The utility identified which inquires to automate by keeping track of the reason why each customer called. The categories it chose for automation were account balances, payment tracking and meter reading scheduling.

"We thought we could get anywhere from 25,000 to 50,000 people who called for these three categories a year out of the queue," Toledo said.

Internal considerations

But before the decision was made to install the Conversant system, Toledo had to address upper management's concerns about the ability of the voice response unit to improve customer service.

"There was some internal resistance from our vice-presidents, some of whom didn't feel that this was customer service," Toledo said. The vice-presidents "felt that most callers would still want to talk to a live agent."

"What we attempted to do with the system was to get the easy calls out of the queue," Toledo said.

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To address those concerns, the company agreed to configure the system to enable callers to transfer to an agent. Management approved the plans to use the voice response unit in late 1988, and the system came on-line in March 1990.

The voice response unit greets customers calling in on a special 800 line and asks them to press 1 for their account balance, 2 for information about the last three payments they made and 3 for the next scheduled meter reading date.

Boston Edison has 15 T-1 Megacom 800 trunks terminating at an AT&T private branch exchange configured as an automatic call distributor (ACD).

The system has off-loaded calls from ACD agents and has enabled Boston Edison to reduce staff.

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The Conversant system prompts callers to press 1 if they are calling from a push-button telephone and transfers them to a live agent if there is no response, Toledo said. Callers with push-button phones are then prompted to key in a 12-digit account code, which the voice response unit repeats using synthesized speech.

The system, which emulates an IBM cluster controller, retrieves the requested information from an IBM mainframe and uses synthesized speech to deliver the data.

Over the past three months, Boston Edison fielded 3,300 calls per week, of which 22% could not use the system because they were made from rotary phones. The remaining 2,500 to 2,600 inquiries per week were handled by the voice response unit. "We are very happy with that number," Toledo said.

The system has off-loaded calls from ACD agents and has enabled Boston Edison to reduce staff. "We had a few people who retired whose posts I could not fill," Toledo said. ◘

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FCC outlines plans for PCN services

continued from page 13

explored at the December hearing, the FCC indicated that it is trying to take a measured approach to PCN that balances the needs of existing users with the potential benefits of the new technology.

"We recognize that serious issues may exist for the incumbents in this [frequency] band, and we intend to reallocate the spectrum needed for [PCN] with minimum disruption to existing users," the FCC stated in its order.

However, FCC Chairman Alfred Sikes has made it clear that he fully supports the development of new technologies and wants to move ahead with PCN.

FCC Commissioner Sherrie Marshall echoed those sentiments at the public meeting last month.

"What is most important is our desire to allocate sufficient spectrum" for PCN, Marshall said. She indicated that the FCC could move forward to assign frequencies to PCN providers next year.

There are currently about 50 firms that have applied to the FCC to conduct experimental trials of PCNs to see if the technology, which uses low-power signals sent across a wide area, can coexist with other technologies such as microwave. Those firms include cable television operators, cellular operators, local carriers and even AT&T.

In addition to deciding how much spectrum to award for PCN use and what technologies can coexist there, the FCC will work out a number of technical, business, policy and regulatory issues surrounding PCN.

For example, the FCC will have to decide whether PCN is offered as a private service or as a common carrier service, meaning that companies must file tariffs and offer their services to all customers on a nondiscriminatory basis.

The FCC will also have to determine how to award PCN licenses, how to allocate spectrum, how PCNs will interconnect with each other and with traditional telephone companies, and how telephone numbers will be assigned. ◘

Carrier Watch

continued from page 13

calls between the U.S. mainland and the Hawaiian Islands.

The service will be available beginning Dec. 12, pending Federal Communications Commission approval.

Accunet Switched 56 service provides on-demand circuits to support applications, including data transport, videoconferencing and Group IV facsimile transmission. The service is provided over a separate network within AT&T's switched network that has been designed and engineered to support high-speed data calls. The service is currently available in more than 500 locations in the U.S. and Puerto Rico, as well as between the U.S. and Australia, Canada, France, Germany, Japan, the U.K. and several other countries.

Northern Telecom, Inc. last week announced that it received a long-term bulk purchase agreement valued at more than $200 million to provide network switches to **Telecom Australia.**

Under the agreement, Northern Telecom will supply Telecom Australia with its DMS line of digital network switches, which it will use to provide basic and intelligent network services.

The equipment will include Northern Telecom's new DMS SuperNode Enhanced Network, including an automatic call distribution system with switch computer application interface and enhanced virtual private networking and calling card services based on an upgraded service control point database.

RCI Long Distance recently announced it has received two contracts to provide operator services and long-distance calling offerings to the University of Rochester in New York. Due to its low prices, RCI was chosen over the Big Three carriers and a regional reseller, according to a RCI spokesman.

Under the first contract, RCI will provide domestic long-distance services through 1992 for the school's faculty, students and staff. The second agreement calls for the carrier to provide operator services for calls made from the school's River Campus, the Eastman School of Music, and the University Medical Center and Strong Memorial Hospital.

The contracts will collectively generate about $1.2 million in revenue during the first year, the spokesman said. In 1990, more than 1.5 million direct-dial and operator-assisted long-distance calls were made from university. ◘

Washington Update

continued from page 13

carrier contends that users can discontinue the plan at any time. The FCC sided with AT&T and allowed the discount plan to take effect last week.

Carrier's int'l revenues rise. A recent report from the Federal Communications Commission on international services showed a substantial increase in carrier revenue during 1990. Revenues for international switched voice and private lines jumped from $3.6 billion in 1989 to $4.3 billion last year.

AT&T again overshadowed all other telephone carriers in the international market in 1990, bringing in revenues of $3.5 billion, or 81.4% of the total market. MCI Communications Corp. followed with revenues of $528 million, while US Sprint Communications Co. secured about $268 million.

Revenues for international record carrier services — telegraph, telex and some private-line offerings — dropped during the same period, from $450 million in 1989 to $371 million in 1990. The leading carrier in this category was Western Union International, with revenues of $179 million. Its closest competitor, TRT Telecommunications Corp., brought in $83 million.

The U.K. has historically topped the list as the recipient of the most outbound traffic from the U.S., and it continued to hold that spot in 1990. Last year, 627 million minutes of traffic went to the U.K., up substantially from 544 million minutes in 1989. West Germany had the second highest traffic volumes with 494 million minutes of traffic from the U.S. in 1990, up from 417 million minutes in 1989. ◘

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Data Packets

Frame Relay Technologies, Inc. of Costa Mesa, Calif., last week announced a software enhancement that lets its frame relay multiplexers support multidrop lines in Systems Network Architecture networks.

Previously, the company's FrameMux 1100 feeder multiplexer and high-end FrameMux 1200 multiplexer supported only point-to-point frame relay links for SNA nets, such as for linking a cluster controller to a front-end processor.

The new SNAroute feature lets users map all or part of an existing multidrop SNA line to a single frame relay private virtual circuit (PVC) without reconfiguring the SNA network.

SNAroute can also be employed to link front-end processors to one another over frame relay PVCs.

SNAroute is available now for a nominal fee to existing users and will come packaged with new FrameMux 1100 or 1200 purchases.

AT&T last week announced it has completed installation on a new packet-switched network for the government's National Marine Fisheries Service (NMFS), a division of the National Oceanic and Atmospheric Administration (NOAA).

The network, dubbed Fishnet, links 33 NMFS locations along 90,000 miles of the Atlantic, Pacific and Gulf of Mexico coastlines and provides dial-up access from virtually anywhere.

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Food distributor beefs up net with Stratus XA2000s

Paves way for series of bridged token-ring LANs.

By Jim Duffy
Senior Editor

ST. LOUIS — Wetterau, Inc., a national wholesale food distributor, has replaced the IBM Series/1 processors in its network with Stratus Computer, Inc. XA2000 systems in what could be a preliminary step toward building a nationwide net of bridged token-ring local-area networks.

Initially, the effort will improve host access for the 2,850 grocery stores and 150 military commissaries that lodge orders with Wetterau. The move eventually could enable the company's 29 national distribution centers to trade information on a peer-to-peer basis without routing information through the mainframe data center.

The primary factor contributing to the move is the Series/1s have run out of gas and cannot keep up with incoming transactions.

"Series/1 is old technology, and it's less reliable," he said. "It has growth inhibitors. We have large volumes of data to send to retail stores. Series/1 can't process all that data."

Previously, the Series/1s handled communications processing in Wetterau's dial-up, order entry in-store communications and electronic data interchange network. That net links grocery stores and military commissaries to the company.

The Series/1s were channel-attached to the company's IBM 3090 host in order to upload order entry and inventory data.

Currently, the Stratus systems are connected to the mainframe via a 4M bit/sec token-ring link to an IBM 3745 front-end processor. Use of token ring provides greater flexibility in attaching other devices and improved performance, Verhaeg said. It also provides insight into how Wetterau may connect headquarters here with all the nationwide distribution centers in the future.

Currently, Wetterau links headquarters to the distribution centers using leased 56K bit/sec lines supporting Systems Network Architecture for IBM 3270 terminal sessions and Binary Synchronous Communications protocols for 5250 sessions and batch printing.

The lines are split into multiple 9.6K bit/sec circuits at the distribution centers. There, they attach to System/38 and 36 midrange processors as well as 3174 and 3274 controllers, all of which support attached printers and terminals.

Under the setup, all routing is handled by IBM's VTAM software on the mainframe and Network

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Motorola takes wraps off OSI development platform

By Jim Duffy
Senior Editor

NEW YORK — Motorola, Inc. last week unveiled a development environment that allows users, software developers and system integrators to build distributed applications on top of standard network transport protocols.

The Open Systems Interconnection Development Platform (OSI-DP) allows developers to build proprietary or OSI-based applications, such as File Transfer, Access and Management (FTAM) and X.400-based electronic mail, on top of OSI transport protocols.

"Our customers have industry-specific applications that require OSI transport services," said John Killion, product marketing manager for networking and communications at Motorola's Technical System Division.

"This is just a small piece of code that allows you to develop applications on top" of those services, Killion added.

OSI-DP is implemented on a Motorola 68000 hardware base and the Unix System V Release 3 operating system. OSI-DP provides applications developers with code to link an application to underlying OSI net services.

OSI-DP packages the lower four layers of the OSI protocol stack — physical, data link, network and transport — with Unix's transport-layer interface for local- and wide-area networks.

OSI-DP is an outgrowth of Motorola's MicroMAP software product suite, which includes MAP 3.0 transport protocols, Manufacturing Messaging System applications and interfaces for Ethernet and Token Bus LANs.

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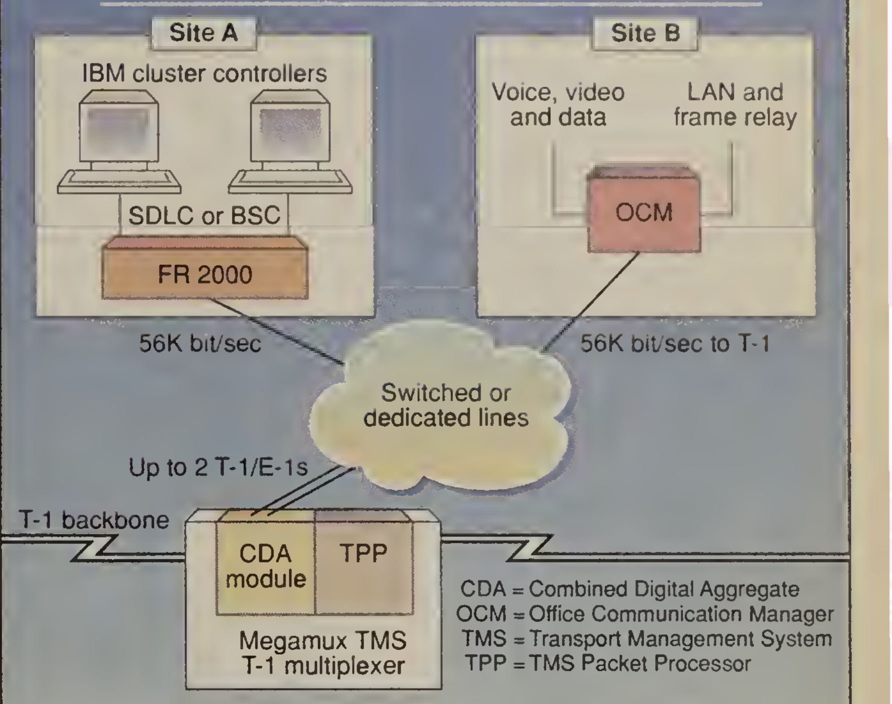
GDC covers the frame relay bases



CDA = Combined Digital Aggregate
OCM = Office Communication Manager
TMS = Transport Management System
TPP = TMS Packet Processor

GDC's FR 2000 and OCM are designed to support frame relay and other traffic at low-volume sites, while its new TPP module gives its T-1 multiplexer support for high-speed packet applications.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: GENERAL DATACOMM, INC., MIDDLEBURY, CONN.

GDC mux to meld packet, circuit data

Mux reflects plan to address user need to support packet-based applications alongside circuit data.

By Paul Desmond
Senior Editor

MIDDLEBURY, Conn. — General DataComm, Inc. (GDC) plans to unveil a low-end multiplexer early next year that will enable multiple voice, data, video and frame relay applications to share a common switched or dedicated access line to a corporate backbone.

The new multiplexer is part of GDC's plan to address emerging needs for packet-based applications. It will complement a previously announced packet module, scheduled for delivery at the end of 1992, that will give GDC's high-end Megamux Transport Management System (TMS) T-1 multiplexer support for high-speed packet applications ("General DataComm set to resell Alcatel SONET switch," *NW*, Nov. 12, 1990).

GDC last week also provided new details on how its new packet module, dubbed the TMS Packet Processor (TPP), will work.

According to Jonathan Reeves, marketing manager for multiplexers and packet products at GDC, based here, the TPP will take advantage of previously untapped features of the TMS bus that will provide for 270M bit/sec bus throughput with packet-based applications. The current maximum bus throughput is 45M bit/sec.

GDC's new low-end multiplexer, called the Office Communication Manager (OCM), will be one of the GDC products that feed packet traffic into the TPP. GDC plans to formally announce the product early next year and ship it in March.

The OCM supports as many as two T-1 or E-1 wide-area links capable of supporting an array of devices on the local side, including videoconferencing equipment, local-area network bridges and routers, cluster controllers, and private branch exchanges.

The device also supports frame relay, Reeves said, meaning it can provide an interface to a public or private frame relay network.

The OCM is different from other feeder multiplexers because it has three system buses, according to Reeves.

The first is the network bus, which is structured around 64K bit/sec channels and is used for applications such as the drop and insert of DS0-based voice circuits. The subrate bus is used to support the multiplexing of data applications ranging from 1,200 to 2M bit/sec, and the packet bus supports LAN and frame relay traffic.

"The classic feeder multiplexer designs have tended to be [time-division multiplexer]-oriented with little provision for packet processing," Reeves said.

Each bus feeds into a Line Interface Module, which combines

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Data Packets

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According to Mike Fraser, chief of data management for NMFS, the new network will allow users working on ecosystem management problems to tap into NOAA computer databases located in Beaufort, N.C., Miami, Monterey, Calif., and Woods Hole, Mass.

Prior to the advent of Fishnet, the research data had to be mailed.

Network Computing Devices, Inc. (NCD) last week brought out an X terminal that communicates with host computers over serial lines rather than local-area networks.

The NCD15s is a monochrome X terminal with a 15-in. diagonal screen and 1,024- by 800-pixel resolution. It is intended for use in remote sites or for direct local connections in small multiuser personal computer clusters.

Serial communications is established using NCD's proprietary XRemote software, developed expressly to handle the bandwidth demands of graphics-oriented X Window System environments. XRemote operates 10 times faster than the de facto standard Serial Line Internet Protocol, according to NCD, which is based in Mountain View, Calif.

The NCD15s is available 60 days after receipt of order. The product is priced at $1,245. ◘

Distributor beefs up net with XA2000s

continued from page 17

Control Program on the front-end processor. By transitioning the distribution centers to bridged token rings, the centers can communicate on a peer-to-peer basis.

"The objective [for installing token rings at the distribution centers] is to make it all networked so users anywhere on the net can have access to data in the corporation," instead of going through the mainframe at the data center here, said Tony Verhaeg, Wetterau's vice-president of technical services.

A bridged token-ring network will also result in more effective utilization of the 9.6K and 56K bit/sec lines, Verhaeg said, and the distribution centers will be able to deploy more than one 9.6K bit/sec tail circuit at a time.

The bridged token-ring network is still on the drawing board and under evaluation. In addition, there is no corporate commitment at this time to deploy the network, according to Verhaeg.

In the meantime, the distribution centers receive order entry information from the data center only after the mainframe receives it from grocery stores and commissaries. Wetterau's customers use hand-held terminals with bar code readers to scan store shelves and take inventory. Grocers determine quantities for restocking and then upload the data via modem to the Stratus computer at 1,050, 1,200 or 1,350 bit/sec.

Most of the order entry terminals are low-cost digital devices that transmit streams of data in bit format. They do not use a standard communications protocol.

Wetterau programmed a communications interface that allows the Stratus system to recognize the differences between the transmission speeds and formats used by the various order entry terminals.

When the system dials out at 1,200 bit/sec to the stores in order to retrieve order entry information — a process known as automatic polling — the Stratus processor automatically switches to the bit rate of the receiving terminal, Verhaeg said.

"We make sure the system is totally unattended," he said. "It makes calls automatically and sends information over to [the mainframe]."

The Stratus system processes the order, forwards it to Wetterau's IBM 3090 mainframe computer via an IBM Advanced Program-to-Program Communications session for transaction logging and fulfillment information. The 3745 front-end processor. then directs the order via the leased 56K bit/sec line to one of the wholesaler's 29 nationwide distribution centers for fulfillment. ◘

Motorola takes wraps off platform

continued from page 17

Motorola modified the MAP 3.0 code and optimized it for LANs and X.25 WANs, Killion said.

Motorola also mandated use of Unix System V Release 3 — instead of Release 4 — as a development environment because Motorola's customers have a preponderance of Release 3 installed and feel Release 4 is "an untested implementation" of the operating system, Killion said.

"They're more concerned about a reliable Unix," he said. "They feel Release 4 is too large and requires too much memory. They'll have to replace a whole system to put Release 4 on it."

Killion said Motorola will issue a Unix System V Release 4 version of OSI-DP in the future.

The LAN transport-layer interface in OSI-DP supports the OSI transport protocol Class 4 for error detection and recovery, as well as Ethernet and Token Bus interfaces. A future release of the development environment will support a token-ring interface, Killion said.

The WAN transport interface supports an X.25 interface and transport protocol Classes 0, 2 and 4.

OSI-DP is expected to be available in January at a price of $1,095. ◘

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Circle Reader Service #105

Mux to meld packet, circuit data

continued from page 17

all the traffic and provides the link to the wide-area circuit.

The wide-area link can be either a switched connection, such as 384K bit/sec or Integrated Services Digital Network Primary Rate Interface lines, or a leased line.

The OCM is designed to work with the TMS' Combined Digital Aggregate module, which supports two T-1 or E-1 links and lets each DS0 within those links be routed separately. In that fashion, up to 24 OCMs located at remote offices could feed into a single T-1 access line to a backbone TMS switch.

GDC has other products that address only some of the functions of the OCM, Reeves said. Its LAN*TMS, for example, is a LAN bridge/router, and its FR 2000 provides a frame relay interface for Synchronous Data Link Control and Binary Synchronous Communications devices. That lets users choose, on a location-by-location basis, only those functions they need (see graphic, page 17).

The high-speed strategy

The company's TPP module will address the need to support high-speed packet-based applications, including frame relay. The first version of the TPP will be able to handle two data channels, such as from a bridge/router, at up to 10M bit/sec each,he said.

The TPP takes advantage of the bus architecture of the TMS T-1 multiplexer, which uses a proprietary asynchronous transfer mode bus based on cell switching, not time-slot interchange like most competitive products.

GDC uses three cell types with the TMS bus: bit, nibble and block mode.

With bit mode, a cell is used to transport a single bit of data.

"The characteristic of that is you get extremely low nodal delays for circuit-switching applications," Reeves said. Bit mode is intended for use with such applications as terminal-to-host transactions, subrate data multiplexing, videoconferencing and computer-aided design and manufacturing applications where response time is critical.

Nibble mode is used to transfer bytes of data between cards in the multiplexer. It is used for higher speed circuit-switching applications at Nx64K bit/sec rates and for the high-speed cross-connection of DS0s or T-1s, for instance, to emulate a digital access and cross-connect system.

The TPP module will address the need to support high-speed packet-based applications, including frame relay.

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Block mode, which will be used by the new TPP module, is a cell type that was built into the TMS architecture but has not been used yet.

Any bus capacity that has not been allocated to bit or nibble modes can be contended for by applications that employ the block mode. That means packet processing cards, like the TPP, can seize all available bus capacity — up to 270M bit/sec — at any time to support high-speed packet-switching applications.

Steve Taylor, a principal at Distributed Networking Associates, a consultancy in Greensboro, N.C., said the bus architecture will effectively position GDC to support packet-based applications.

"Their mux has some nice capabilities for becoming a packet switch in that it's a contention bus as opposed to being a TDM bus," Taylor said. "They certainly have the raw horsepower there to make it into a packet-oriented switch or to develop packet-oriented capabilities — probably better than most of their traditional T-1 mux competitors." ☑

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Worth Noting

Wireless communications product sales will quadruple by the end of the decade, increasing from $5.5 billion in 1991 to $22 billion by the year 2000, according to a recent study by ElectroniCast Corp., a San Mateo, Calif.-based company specializing in trend forecasts for the fiber-optic and wireless communications markets.

Netnotes

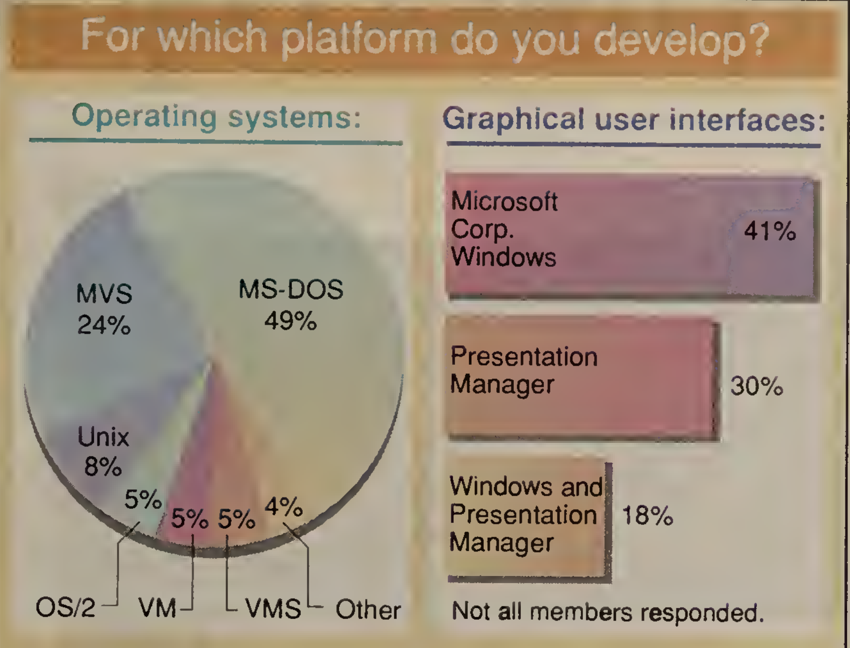
NetWorth, Inc. has introduced the Series 4000 Discovery Management System, a Microsoft Corp. Windows-based Simple Network Management Protocol (SNMP) management product for local-area networks. Unlike other LAN management products, Discovery supports SNMP and Novell, Inc.'s Internetwork Packet Exchange (IPX), enabling the product to monitor multivendor SNMP devices as well as Novell's NetWare devices.

Discovery is a proactive net management tool that automatically invokes backup links if a primary link fails, performs remote paging when a problem or potential problem appears on the net and automatically scans for viruses.

The Discovery Management System is expected to be available in the first quarter of next year for $2,395.

Futurus Corp. has introduced an electronic mail package specifically for Novell, Inc. NetWare Lite users. According to Futurus, based in Metairie, La., LiteMail is a low-cost, easy-to-use product. It has a suggested retail price of $39.95 per workstation and comes standard with full E-mail, telephone message and real-time chat capabilities.

LiteMail, available now, is the first in the firm's peer-to-peer E-mail products.



Figures are based on responses from about 80 members of the American Software Association.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: AMERICAN SOFTWARE ASSOCIATION, ARLINGTON, VA.

N.Y. Tel building internet to support LANs at 31 sites

Net to handle engineering, provide host access.

By Timothy O'Brien
West Coast Bureau Chief

NEW YORK — New York Telephone Co. last week revealed that it is building a LAN internetwork to support 60 new Banyan Systems, Inc. VINES local-area networks being installed to handle engineering operations in 31 locations here.

By year end, the internet, which will be outfitted with gateways to host computers, will enable some 2,000 New York Telephone employees to use a common LAN-based infrastructure to access a range of net resources. Eventually, the network will be expanded to support LANs throughout New England Telephone and Telegraph Co. offices.

"This network will allow us to take down two or three tubes on many desktops and let the users rely on their personal computers and LANs for communications," said Eric Troup, staff manager and co-coordinator of the project at New York Telephone.

During the 18 months New York Telephone spent evaluating and prototyping LAN offerings, it became clear that the most important criteria for the selection would be the ability to support wide-area links and distributed applications.

As a result of the choice to go with Banyan, the carrier believes it will be able to leapfrog the isolated departmental LAN phase of network implementation and move directly to a LAN internetwork, which will give users access to net resources companywide.

"We wanted to build a wide-area network infrastructure quickly and not have to worry about how messages and data will get from Point A to Point B," said Madelon MacKenzie, also a staff manager at New York Telephone and co-coordinator of the project with Troup.

Since the engineering division needs access to data that supports the design and maintenance of telephone facilities throughout the Northeast, replacing a predominately paper system was becoming critical.

Engineers who do computer-aided design will now have online access to records outside the plant that are stored in host databases.

Other applications on the servers include a full suite of office automation programs as well as electronic mail. MacKenzie explained that groupware programs such as Lotus Development Corp.'s Notes are currently being evaluated.

In addition, new databases will be developed using Oracle Corp. and Informix Software, Inc. products to streamline operations in a restructuring and downsizing effort.

The carrier stressed, however, that it plans to retain many host systems and will implement the LANs more to accommodate growth, rather than replace existing systems.

For example, New York Telephone will keep its Wang Laboratories, Inc. minicomputers for mission-critical applications but has asked Wang to provide links to the Banyan LANs.

One area that has caused concern for management is security. As an additional precaution

(continued on page 26)

DCA takes first step into the fiber arena

Unveils token-ring fiber adapter, media access unit and stand-alone converter for older boards.

By Caryn Gillooly
Senior Editor

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) last week made its first foray into the fiber-optic market with the introduction of a fiber-optic token-ring adapter, media access unit (MAU) and a copper-to-fiber converter.

The products will let users integrate fiber-optic connections into their existing token-ring networks while maintaining current copper-based connections.

According to DCA, based here, these products are the first to take advantage of the company's Irmatrac upgradable adapter design. DCA's existing Irmatrac cards have a removable Ring Interface Module (RIM), the device that provides the physical wire connection.

Virgina Lenahan, a product marketing manager at DCA, said the removable RIM is a daughterboard that can be snapped on and off the adapter. Customers that want to change the type of media in their networks can keep the adapter card and replace the cable interface.

"The [removable] RIM is designed to let users upgrade the board in the field and adapt to new technologies," she said.

The new Irmatrac 4/16 Fiber Optic Token-Ring Adapter Convertible is based on DCA's existing Irmatrac card — which supports shielded and unshielded twisted-pair wire — outfitted with a fiber-optic RIM.

Customers with existing Irmatrac boards will be able to upgrade them to support fiber by adding the new RIM.

The new board can be used with personal computers based on either the Micro Channel Architecture or Industry Standard Architecture bus. Used in conjunction with the other new products, the interface will let users build fiber-based token-ring nets running at 4M or 16M bit/sec.

The other key component of those networks is the new Irma-

(continued on page 26)

R:BASE product acts as front end to SQL servers

By Timothy O'Brien
West Coast Bureau Chief

LAS VEGAS — Microrim, Inc. took advantage of the Comdex/Fall conference to show off its recently introduced Vanguard line, front-end tools based on its R:BASE product that customers can use to access SQL server databases.

Although the first Vanguard products can only be used with databases running in Digital Equipment Corp. VMS environments, Microrim plans to provide Vanguard products that can be used with databases on other platforms, such as Unix.

"We'll be increasing very rapidly the number of server platforms and the number of network protocols we support in order to provide data location independence," said Jack Noonan, president and chief executive officer of Microrim.

In the initial release of Vanguard, Microrim will offer an enhanced version of its relational database management system called R:BASE/V as a front end and Vanguard Data Connector VAX software for the target server database. Data Connector software is available for Oracle Corp.'s Oracle database, ASK Computer Systems, Inc.'s Ingres Intelligent Database and DEC's Rdb database.

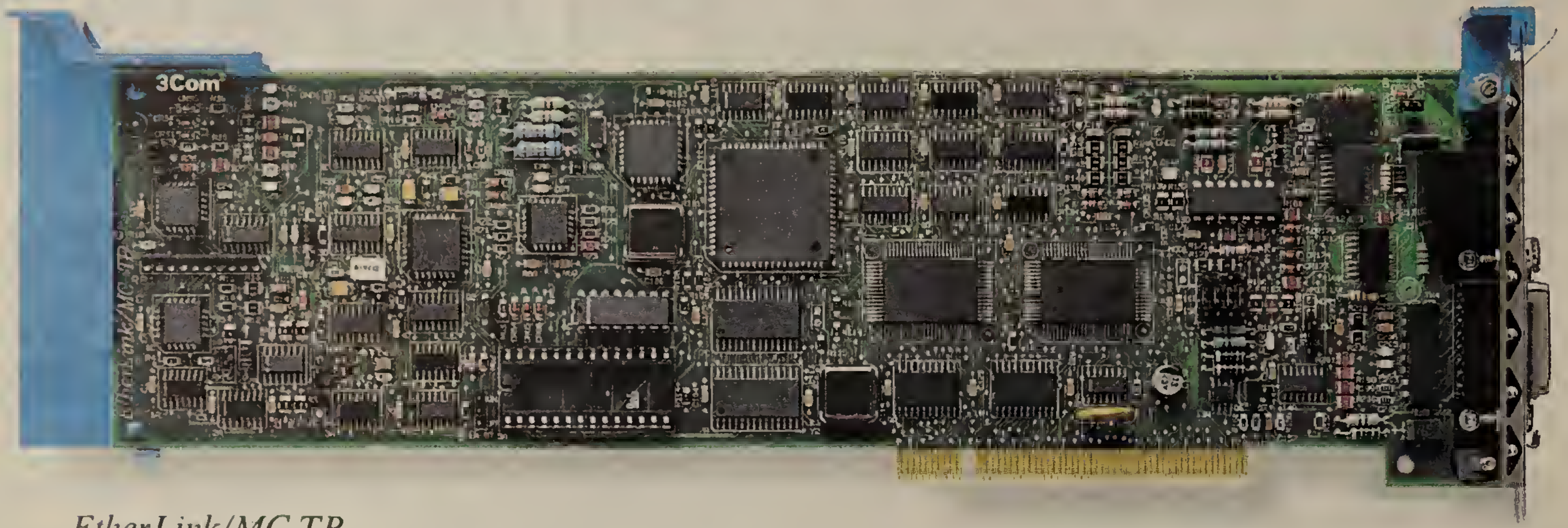
Instead of simply providing terminal emulation or massive downloads of copied data, Vanguard provides real-time read and write capabilities using the full set of its R:BASE DBMS tools, including query, browse, edit, report creation and an application developer.

When R:BASE/V, which runs on personal computers under DOS or OS/2, is coupled with a Vanguard Data Connector running on the VAX, users can query, update and manipulate this live data since all database processing takes place on the server engine while maintaining data security and concurrency control.

For users of the three databases that Microrim supports, the company is boldly pitching Van-

(continued on page 26)

Every twisted question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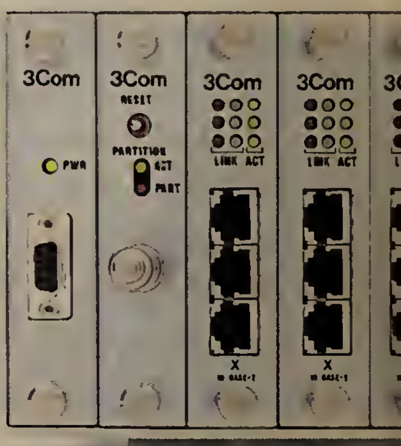
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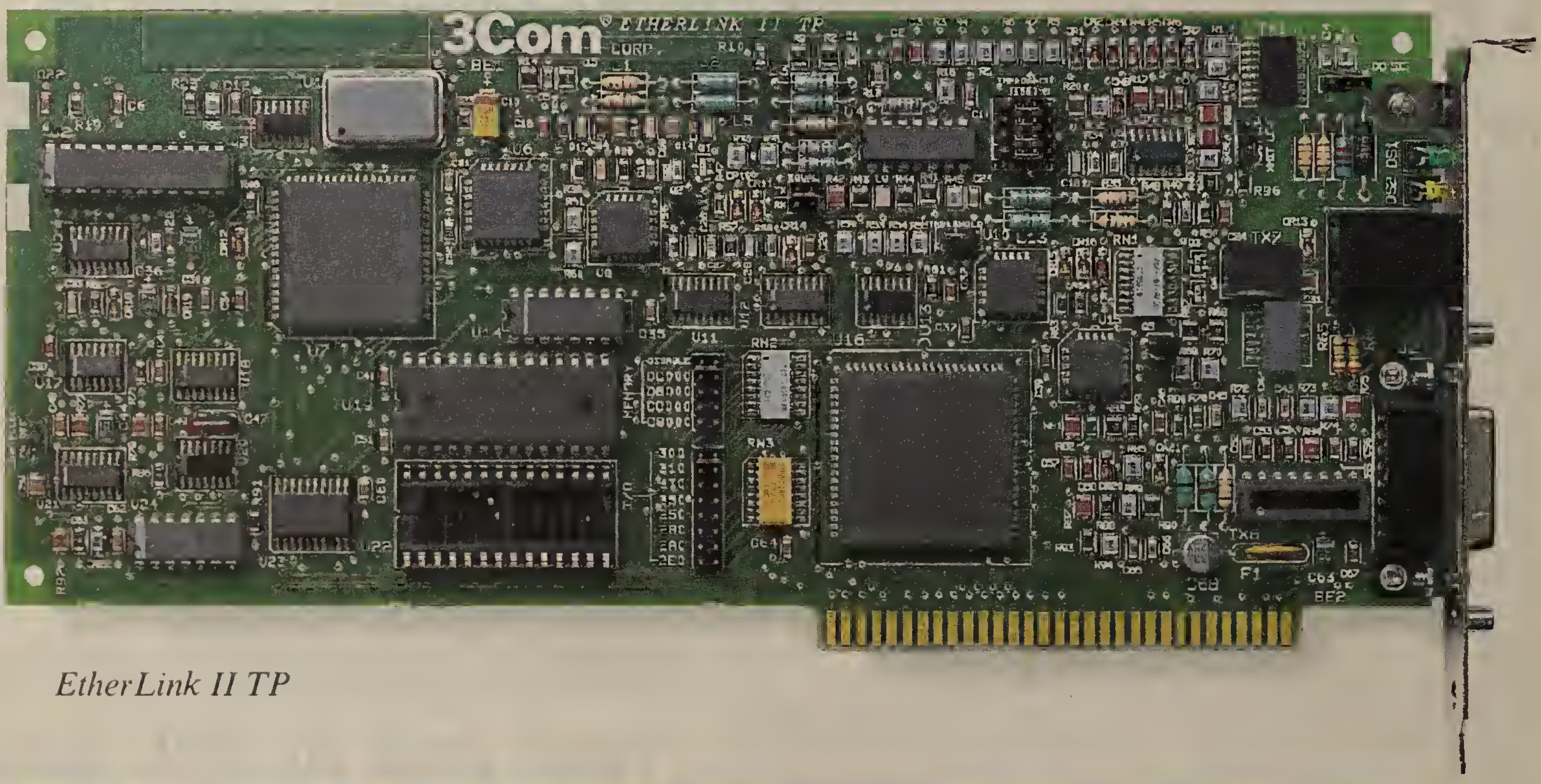
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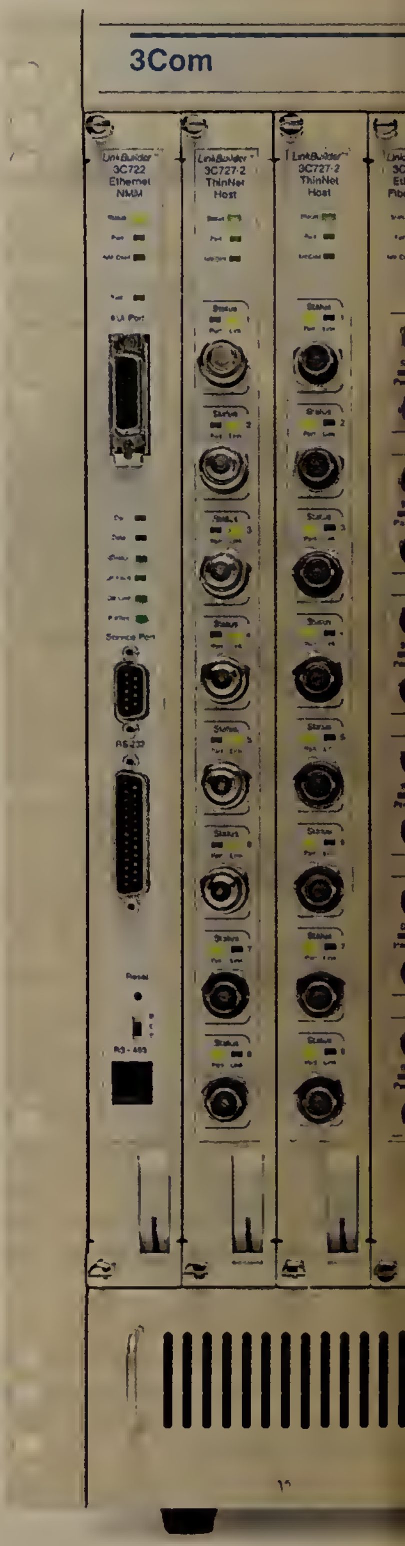
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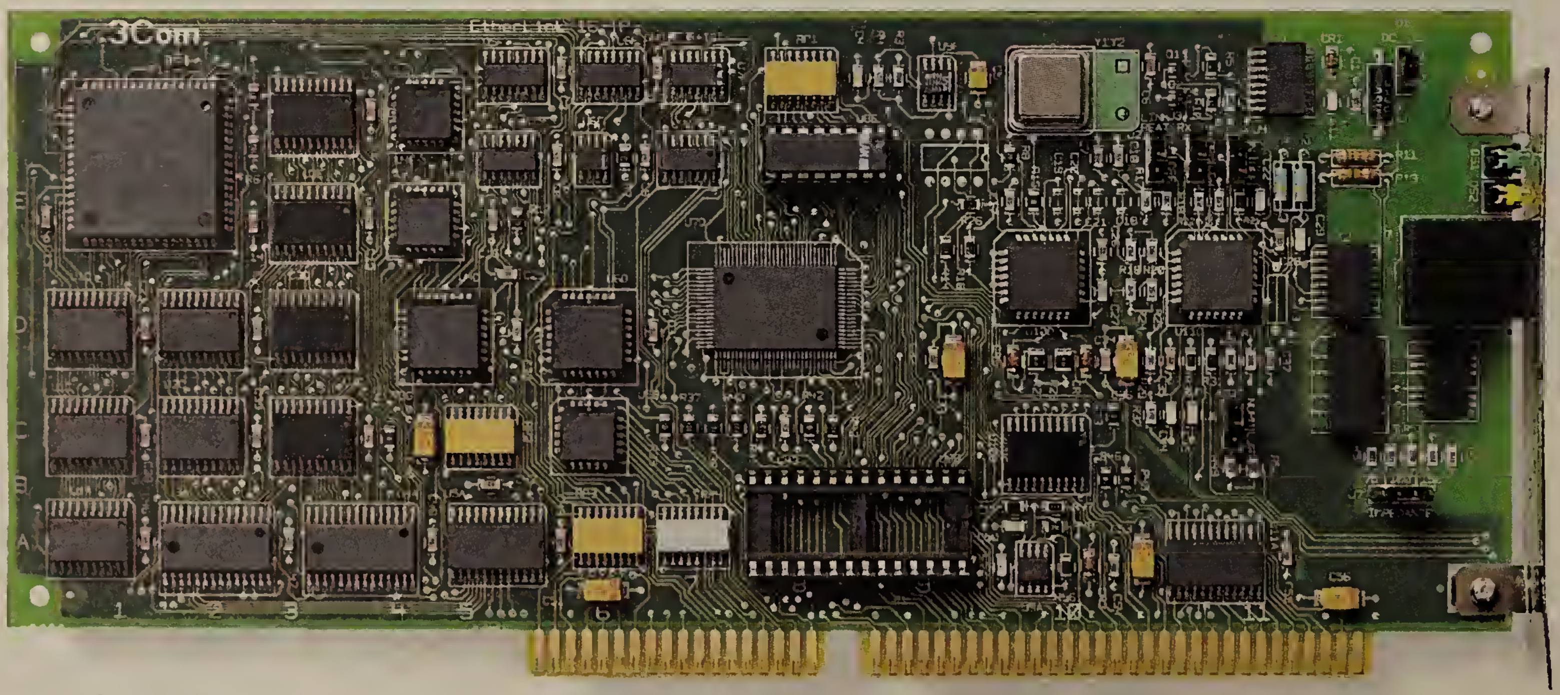
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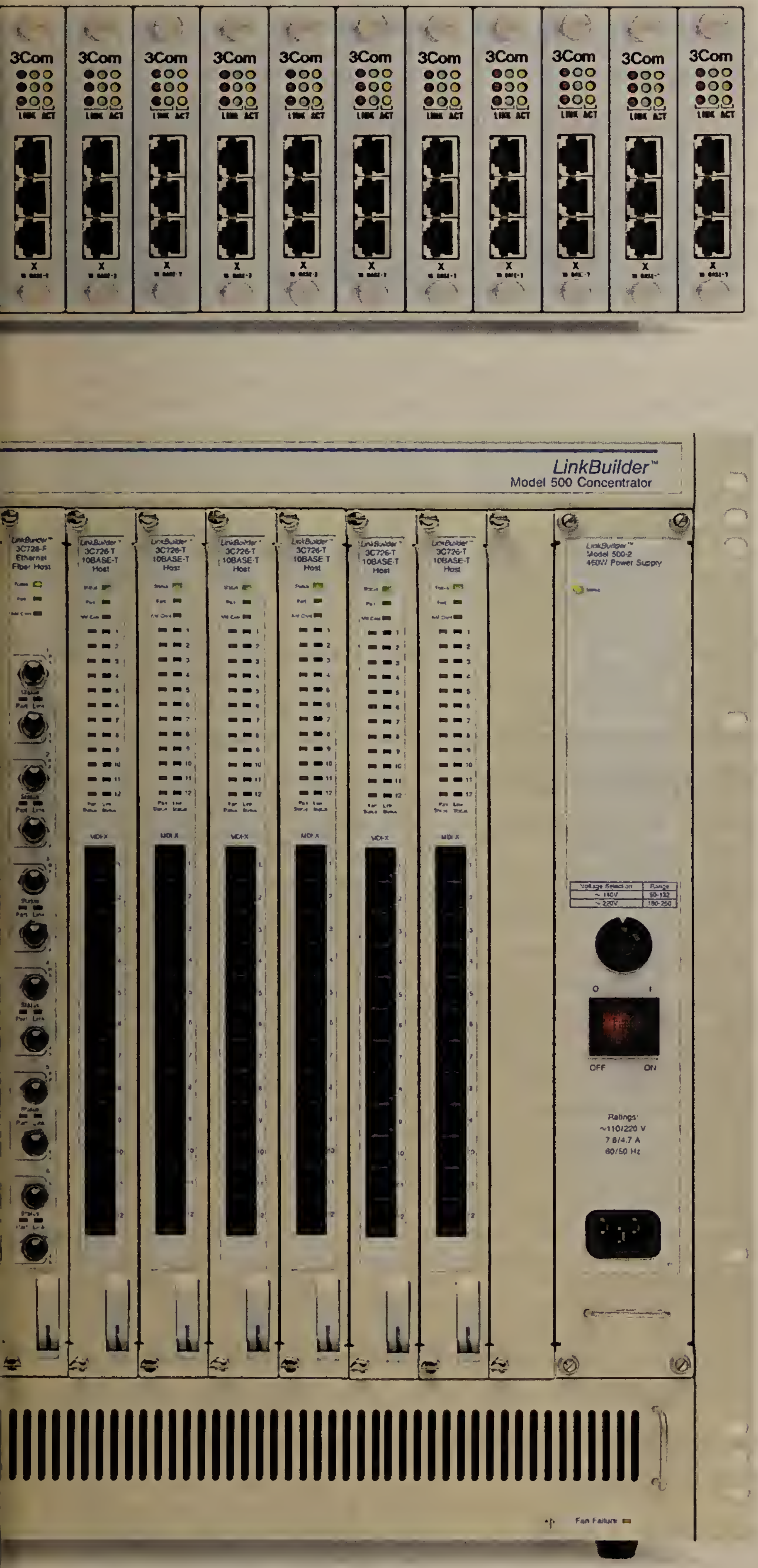
deserves a simple answer.



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OCTuS broadens its horizons with LAN print server product offerings

New devices include printer accelerators, high-end print servers.

By Timothy O'Brien
West Coast Bureau Chief

LAS VEGAS — OCTuS, a supplier of high-end laser printers, has expanded its scope with the recent introduction at Comdex/Fall of a range of network integrated print server products for local-area networks.

Touted by OCTuS for their scalability and ease of use, these new products include printer accelerators, stand-alone network print servers and high-end print servers with scanning and facsimile communications capability.

"We want to extend the concept of shared network resources by combining some of these functions in a single server so that they are easier to use," said Nolan Bushnell, the recently appointed chairman of OCTuS and founder of Atari Corp.

Some of the OCTuS products are designed to support existing individual network resources, while others will fulfill functions now performed by multiple LAN servers.

The first product is the OCTuS PDL-Net, an accelerator card for LAN-based personal computers supporting laser printers. PDL-Net can be used with as many as two printers and five different page description languages. OCTuS claims PDL-Net speeds document printing by as much as 10 times compared to conventional PostScript configurations.

OCTuS is also offering the PrintNet line, network printer servers that offer the same features and functions of PDL-Net but come as a complete stand-alone system rather than just an accelerator card. The PrintNet line supports as many as five page-description languages for as many as four attached printers.

OCTuS is incorporating Insight Development Corp.'s Mosaic print server software into its own print management software, which uses Microsoft Corp.'s Windows as a graphical user interface. This new software will monitor all print resources on the net and provide network administrators with an accounting report of resource usage.

Moving up the product line, OCTuS is offering CommNet, the personal computer-based communications servers that offer the same functions, software and number of ports of the PrintNet line but add scanner support along with fax transmission and reception capabilities. The CommNet servers include as many as eight communications ports for sending or receiving faxes and a standard serial interface for the scanner connection.

Prices for PDL-Net range from $3,495 to $4,495, while prices for the PrintNet line range from $3,975 to $6,995. Products in the CommNet line cost from $4,995 to $12,195. PDL-Net and PrintNet products are scheduled to be available in December. The CommNet line is expected to be available in the first quarter of 1992.

While the PDL-Net product is network-type independent, the rest of the product line will only support Novell, Inc.'s NetWare for the time being.

OCTuS is located in San Diego and can be reached at (619) 437-1880. ◘

OCTuS claims PDL-Net speeds document printing by as much as 10 times compared to conventional PostScript configurations.

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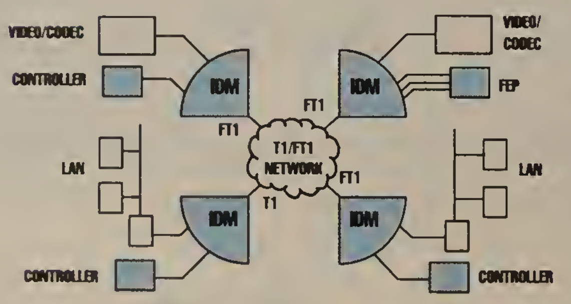

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DCA takes first step into the fiber arena

continued from page 23

trac MAU, a fiber optic-based passive hub used to connect token-ring workstations in a physical star configuration. According to Lenahan, there are no off-the-shelf token-ring MAUs for fiber because the industry has yet to develop a standard for token-ring transmission over fiber.

Two of the new MAU's 16 ports support copper cabling, so users can have both fiber- and copper-based clients on the same token-ring local-area network.

DCA also introduced the Irmatrac 4/16 Fiber Optic Converter, a stand-alone conversion box that enables existing token-ring interfaces to support fiber links. Lenahan said the converter typically will be used with copper-based token-ring interfaces inside front-end processors and cluster controllers that need to be attached to fiber-based token-ring LANs.

In this scenario, the mainframe can act as just another node on the LAN. "This lets the mainframe connect to the MAU as if it were a PC, and it lets PCs access it as if it were" another microcomputer, she said. "The mainframe expects you to have twisted-pair [media], and this solves that problem."

The Irmatrac 4/16 Fiber Optic Token-Ring Adapter Convertible will cost $1,195, the Irmatrac Fiber MAU will cost $4,995, and the Irmatrac Fiber Converter will be priced at $695. Current Irmatrac users can buy the Irmatrac Fiber Optic RIM for $495.

All these products are expected to be available early next year. ◘

R:BASE product acts as server front end

continued from page 23

guard as an upgrade since it makes data more available to desktop users while protecting current investments.

Under development since 1988, Microrim is building the Vanguard products to emerging database standards. Vanguard clients communicate through an ANSI Level II-compliant SQL application program interface that translates all requests from the client into a common language.

Vanguard Data Connectors translate all requests into a database server's language. After the server processes the data, the results are translated back to the client language. In this way, the user sees the results without knowing where the data resides or how it was processed.

In addition, Vanguard customers will be able to use a single front end to move files between R:BASE, Oracle, Ingres, Rdb and even Borland International, Inc.'s dBase product.

Although most client/server front ends provide support for the popular Microsoft Corp. Windows graphical user interface, Microrim is bucking the trend and sticking with its character-based interface.

Although he has taken heat for it from analysts, Noonan maintains that Vanguard users working on VAX-based transaction-oriented applications — primarily forms processing and data input — will be better served by a character-based interface for the forseeable future.

Vanguard products provide network communications using a peer-to-peer architecture with task-to-task connectivity at a call level. Only the DECnet protocol is currently supported.

The Vanguard Data Connector is priced at $4,995 for a single user and $995 for each group of five users thereafter. Prices for the R:BASE/V client are $995 for the first user and $995 for each five-user cluster thereafter.

The Oracle and Rdb products are available now, while the Ingres version will be out by year end. ◘

N.Y. Tel building internet for LANs

continued from page 23

against hackers, remote users will need to dial in to a special hub that uses a rotating password.

Software running on the hub changes the password every 20 seconds in sync with the same changes occurring in software running on the remote user's computer. In this way, management believes it can offer security above and beyond VINES and provide more centralized control.

Management is also keeping an eye open for future WAN opportunities. Although the WAN facilities used to link the LANs will initially be packet-switched X.25 links, management plans to eventually use Switched Multimegabit Data Services.

Devices to be supported on the LANs include AT&T StarServers and IBM Personal System/2 servers, some of which will be configured with up to 48M bytes of random-access memory and 3G bytes of storage.

Because the company also uses many Unix workstations in CAD, Troup said it will be pressing Banyan for full Unix client support under VINES. ◘

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Worth Noting

"Users want a single point of contact and nationwide service, but vendors are starting to ask users to reciprocate by centralizing the buying decisions of their various business units."

Patrick Springer
Director of Industry
Services Consulting
Computer Task Group
Lowell, Mass.

Association Watch

Omnicom, Inc. recently announced the first three elements in a new curriculum series called **Open Systems Education: Especially for Users,** designed to aid users in planning and implementing open systems.

The components include an executive overview that focuses on issues that senior managers face when evaluating open systems implementation.

The term "open systems" is defined, its impact on productivity is discussed, and a sample business case is presented for converting from a proprietary to an open systems environment.

A second component includes a three-day open systems workshop — sponsored in conjunction with the National Computer Centre in the U.K. It contains sessions on topics such as open systems architecture and technology, Open Systems Interconnection operations and managing the transition to open systems.

The third component is a video library that provides courses in open systems fundamentals, interoperability and specific open systems applications that can be used throughout an organization.

For further information about Open Systems Education, contact Cecilia Siamundo at (703) 281-1135.

Bank consolidations bring unique network problems

Some embrace outsourcing as a cure for their ills.

By Maureen Molloy
Staff Writer

BURLINGTON, Vt. — The mad pace of consolidation in the banking industry has left some players with unforseen network nightmares.

Such was the case with five Vermont banks that recently merged to form the Banknorth Group, Inc. only to discover that the network infrastructure could not sufficiently accommodate the needs of the new corporation.

A network comprised largely of dial-up links that served as the key communications mode between a handful of local banks was "wholly inadequate" for what was now the largest bank holding company in Vermont, according to Mark Wetmiller, Banknorth's director of operations.

The company needed to install a more robust network in order to link the 53 Banknorth banking and operations sites throughout the state.

The company outsourced the design and installation of a T-1 network that would replace the dial-up net to Rutland, Vt.-based Bargmann Bowen and Kemp, Inc. (BB&K), a telecommunications research and consulting firm. In addition to constructing the network, BB&K is also managing Banknorth's entire network operations.

"We're strictly a banking company and had no interest in getting into the business of providing telecommunications services," Wetmiller said. "By outsourcing the network, we've been able to provide our employees and customers with much better service — via more sophisticated technology — and at a much lower cost than if we did it ourselves."

The T-1 network consists of seven major nodes linked with redundant point-to-point T-1 facilities in a mesh topology. Remote sites access the T-1 backbone via 56K bit/sec lines.

The company decided it would be more cost-effective to hand over the management of its new network to BB&K after an inventory and a network analysis of the members' long-distance services proved that "we needed to clean up our act," Wetmiller said. "It was clear that our existing telecommunications systems were in dire need of good management."

For instance, a review of the billing system revealed that the banks had been making thou-

(continued on page 28)

Service helps users form info technology strategy

By Wayne Eckerson
Senior Editor

BLUE BELL, Pa. — Unisys Corp. and the U.K.'s Coopers & Lybrand Deloitte recently announced a service designed to help customers develop strategic plans for implementing information technology.

The two firms jointly developed the Business Solutions Approach, which they said combines Coopers & Lybrand Deloitte's management consulting experience and Unisys' technical expertise.

The cornerstone of the Business Solutions Approach is the Business Planning Workbench, a DOS-based computer-aided software engineering (CASE) tool based on Cooper & Lybrand Deloitte's Summit-S strategic planning methodology.

Business Planning Workbench aids in developing strategic plans to further business objectives. The software helps companies identify business opportunities and the applications needed to support those plans.

Currently, Business Planning Workbench is being beta-tested by five companies in the U.K. and is employed as a standard strategic planning tool by Coopers & Lybrand Deloitte consultants. The product will be available internationally in 1992.

"Our joint initiative will help companies tie the development of information technology to concrete business plans and objectives — something many companies fail to do," said Richard Goyette, vice-president and general manager of Unisys CASE/Fourth Generation Languages here.

Workbench not only identifies potential applications, it establishes profiles of each application. In other words, it helps determine how the application will be structured and what type of in-

(continued on page 28)

The Marine Corps was one of six organizations to receive an Enterprise Network Excellence (ENNE) Award last month at NetWorld 91 Dallas. Pictured from left to right are: Ralph Ianuzzi, show director of NetWorld, Steve Yesenosky, executive director of the ENNE Awards program, Lt. Col. Lawrence Troffer, Maj. Jack Imhof, Capt. Matthew Green, Sgt. Scott Francois, Lt. Col. John Hall and *Network World* Publisher Colin Ungaro.

Six recognized for ENNE achievements

By Wayne Eckerson
Senior Editor

DALLAS — Six organizations were recently named winners of the 1991 Enterprise Network Excellence (ENNE) Awards for achievements in implementing networks that provide strategic advantage.

Sponsored by *Network World* and the NetWorld 91 Dallas conference, the awards attracted more than 250 entrants competing in six categories. The winners were announced at a black-tie banquet in conjunction with the show.

And the winners are . . .

The U.S. Marine Corps and Banyan Systems, Inc. won the award for the best user/vendor partnership; Grand Metropolitan PLC-Food Sector was honored for the best global network; Holiday Inn, Inc. was cited for the best national network; Household International, Inc. won the best regional network; *TV Guide* magazine won the best single-site network; and Systems Software Support, Inc. was cited as the best network integrator.

In addition, the ENNE selection committee presented the Pioneer Award for outstanding individual achievements in the field of networking to Kenneth Olsen, president of Digital Equipment Corp.

The ENNE Technology Leadership Award, which is for a new technology or service that sets a standard for network development, went to Lotus Development Corp.'s Notes groupware product.

The companies and their achievements included:

- The Marine Corps and Banyan were honored for their work in building the Marines' worldwide network of interconnected local-area networks.

The network supports approximately 640 Banyan VINES servers and 20,000 microcomputers.

The LANs are linked to the Marine's IBM Systems Network Architecture backbone net that supports 32 minicomputers and 33 mainframes.

During the recent Operation Desert Storm, the Marines deployed more than 40 VINES LANs to the site with 750 nodes located in tents, mobile units and command centers.

The LANs enabled field groups to exchange messages and receive orders and maps from command centers.

- Grand Metropolitan recently finished a downsizing program in which it installed 281 Novell, Inc. NetWare LANs at 60 sites worldwide and linked them in a LAN internet.

The company, which previously had four mainframes and 110 mid-range computers, now only has one mainframe and 12 mid-range computers on its IBM SNA network.

By distributing processing, Grand Metropolitan has been able to reduce order and delivery cycles, cut errors by 30%, speed time to market for new products and create cost-savings of $16 million annually.

- Holiday Inn's reservation network enables the chain to guaran-

(continued on page 28)

Six recognized for ENNE achievements

continued from page 27

tee that franchise owners will be able to achieve 30% to 40% room occupancy. The net consists of more than 10,000 IBM Personal System/2 computers linked by LANs in more than 2,000 sites throughout the U.S. and 51 other countries.

■ After implementing a personal computer-based loan approval system and more than 70 NetWare LANs, Household International was able to cut the time required to approve wholesale mortgages from several days to one day and general financing from an hour to only three minutes.

Instead of requiring merchants to fax loan applications, the new system lets them use a personal computer to send forms and receive responses.

The new setup has enabled the company to increase the number of its accounts by 1% a month and has contributed to the firm's eightfold growth in recent years and current $2 billion in annual sales.

■ *TV Guide* replaced a 13-year-old mainframe with a Fiber Distributed Data Interface network supporting terminals and workstations used by 150 editors, data collection staff and layout personnel.

The network, which runs the Transmission Control Protocol/Internet Protocol, supports a Unix-based page layout application that the magazine uses to put together 113 regional editions with separate copy and advertising. The net has quickened the process of laying out the editions, allowing the magazine to extend its production deadline an extra day or two to accommodate late-breaking news.

■ Systems Software was recognized for its work in developing a network for Bay State Gas Co. in Massachusetts. The systems integrator replaced mainframe terminals with networked personal computers using NetWare and installed a gateway to the mainframe.

As a result, Bay State Gas' application development costs were pared down from $80,000 to $14,000 for just one spreadsheet application and modem costs were reduced from $50,000 to $5,000. ☒

Service helps users form info strategy

continued from page 27

formation it needs to deliver the desired outcome.

Once the profiles are established, customers use a personal computer-based upper-CASE software tool, such as Unisys' Linc Design Assistant, to develop graphical depictions of the application structure and profiles. Upper-CASE tools perform the preliminary analysis and design of software applications prior to code generation.

The graphical designs are then loaded into Unisys' Linc II Unix-based software, which generates COBOL code to form a working prototype of the application. The prototype can be tested and modified until the final application is developed.

"The Business Solutions Approach streamlines the whole strategic development process," Goyette said. "It takes strategy from boardroom concepts to actual application code."

In most cases, customers will purchase the Business Solutions Approach software along with consulting services from Coopers & Lybrand Deloitte, which would provide the software to develop specific business strategies and applications.

Coopers & Lybrand Deloitte consultants would also train customers to use the Business Planning Workbench software to update their business strategies in the future and determine the impact on their application portfolios.

Business Planning Workbench starts at $30,000, and consulting services are priced according to customer requirements. Linc Design Assistant costs $6,000. The Linc II software comes bundled with the Workbench software.

For more information, call Goyette at (215) 986-6412. ☒

Bank consolidations bring net problems

continued from page 27

sands of dollars in surplus payments each month on circuits that had cancel orders pending.

Wetmiller had also determined he could not afford to hire workers with the technological expertise to manage the network.

Outsourcing has benefitted both employees and customers while cutting monthly communications costs by hundreds of thousands of dollars, Wetmiller said.

BB&K is now responsible for voice and data communications throughout the entire Banknorth Group, which includes all telephone services, as well as automatic teller machines and data processing.

BB&K has since merged the few hundred individual monthly phone bills into one single account.

The vendor has also implemented a statewide, four-digit dialing plan on the T-1 backbone that replaces what was previously dial-up intercompany communications. Wetmiller said Banknorth has saved thousands of dollars each month by migrating intercompany voice traffic onto the T-1.

In addition to significant cost savings, Wetmiller said the outsourcing move has provided end users and customers with better service as well as access to a greater number of resources throughout the company. ☒

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- ☐ Request for proposal
- ☐ Request for information

2. Purchase timeframe
- ☐ Within 60 days
- ☐ Within six months
- ☐ Within one year

3. Scope of purchase responsibility
- ☐ Enterprise wide
- ☐ Departmental

4. Purchase influence/number of sites
- ☐ One site
- ☐ 2-9 sites
- ☐ 10-20 sites
- ☐ 21+ sites

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Circle Reader Service #119

GLOBAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

World News

Japan's dominant international carrier, **Kokusai Denshin Denwa Company, Ltd. (KDD)**, recently announced plans to reduce its international private-line tariffs on Nov. 1.

KDD plans to cut tariffs for its Hi-Bit Link international digital private-line service by an average of 6.1%. For example, monthly charges for KDD's half of a 56K or 64K bit/sec international private line from Japan to the U.S. will fall 5.6%, from 890,000 yen ($6,742 U.S.) to 840,000 yen ($6,364 U.S.).

Monthly tariffs for KDD's half of a 1.5M bit/sec private line to the U.S. will fall 6.6%, from 7.02 million yen ($53,180 U.S.) to 6.56 million yen ($49,700 U.S.).

Ted Ohtsuka, general manager of the New York office of International Digital Communications, Inc., which competes with KDD, said KDD's international private-line rate cuts will reduce his company's discount relative to KDD for digital private lines to the U.S. from 7% to between 3% and 4%.

He said he believes International Digital Communications will respond by cutting international private-line rates, possibly as early as December, to restore the 7% average discount.

International Telecom Japan, Inc. (ITJ), KDD's other competitor, is also considering price cuts in response to KDD's move, according to Leslie Silver, assistant to the general manager of ITJ's New York office. ◘

Infonet to offer int'l SMDS across ATM backbone net

IVAN also releases details of frame relay service.

By Barton Crockett
Senior Editor

EL SEGUNDO, Calif. — Infonet Services Corp. last week announced plans to provide international Switched Multimegabit Data Services (SMDS) and install an Asynchronous Transfer Mode (ATM) backbone network in two to three years.

The international value-added network (IVAN) service provider, based here, also provided details about its previously announced plans to offer frame relay services next year. Additionally, Infonet disclosed plans to open network nodes in 13 more countries.

SMDS by 1994

According to Jean-Noel Moneton, Infonet's vice-president of communications services, the company plans to begin providing SMDS on an international basis in 1993 or 1994. Since pricing and availability have not been finalized, Moneton was unable to say how much Infonet will charge for SMDS, exactly where the service will be available, what equipment will be used or what SMDS user access speeds Infonet will support.

He did say, however, that Infonet plans to offer SMDS as a user interface into an ATM backbone net that the IVAN could install as early as 1994. The ATM backbone should utilize bandwidth more efficiently than Infonet's current T-1/E-1 backbone net based on Network Equipment Technologies, Inc. time-division multiplexers.

ATM will also support multimedia applications better than frame relay or SMDS, which are designed to support only data and still image traffic, Moneton said.

"We have no intention to be in the [public] switched voice business," Moneton said. "But we suspect that the enterprise network of the second half of the '90s will be an integrated voice, fax, video and data network."

Moneton said he believes most IVANs will migrate to ATM backbone networks.

Frame relay plans

Before providing SMDS over an ATM backbone, Infonet plans to support users' bursty, high-bandwidth data transmission requirements with frame relay. Infonet's public frame relay service is scheduled to debut in the second half of next year in 11 countries, including Canada, France, Germany, Scandinavian countries, the U.K. and the U.S.

Infonet will support frame relay access speeds ranging from 56K bit/sec to T-1, Moneton said. The IVAN will offer flat-rate pricing in which users would pay a single monthly fee that varies only with the speed and number of access ports, not with the volume of data transmitted. Company officials declined to release further details about the service.

A source who requested anonymity added that Infonet is still evaluating how its frame relay service will work with the frame relay offering that MCI Communications Corp. is planning for the second quarter of 1992.

The source said Infonet could provide the international links for MCI's domestic frame relay service or the two services could compete, with Infonet's frame relay service being primarily international and MCI's service being primarily domestic. With 25% of the IVAN, MCI is Infonet's biggest shareholder.

(continued on page 33)

Short list of global net consortia

Consortium	Partners	Purpose
Global Communications Service	MCI Communications Corp. in conjunction with 25 carriers in 19 countries.	The provision of one-stop shopping for international private lines, packet switching, equipment collocation and network maintenance services.
Global FON Alliance	Cable & Wireless PLC's Mercury Communications, Ltd. and Hong Kong Telecom International Ltd. units, PTT Telecom Netherlands, TeleGlobe Canada, Unitel, Inc. and US Sprint Communications Co.	Cooperation in marketing of advanced international telecommunications services, principally Global Virtual Private Network and international calling cards.
Joint Network Initiatives	AT&T, British Telecommunications PLC, Kokusai Denshin Denwa Company, Ltd. and Telefonica de Espana.	The provision of one-stop shopping and network design services for global private networks.
Syncordia Corp.	BT, negotiating with Deutsche Bundespost Telekom and Nippon Telegraph and Telephone Corp.	Outsourcing services for global private networks.
Unicom	PTT Telecom Netherlands and Swedish Telecom International, negotiating with major carriers in North America and Asia-Pacific Rim.	Cooperation in the provision of international network services, including outsourcing services for global private networks.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *NETWORK WORLD*

Critics assail global outsource ventures

Some carriers claim the consortia bring nothing new to international one-stop shopping market.

By Barton Crockett
Senior Editor

Although several international carriers are aggressively working to forge new global net outsourcing consortia that they say will revolutionize user networks, some carriers claim the efforts are marketing ploys that fail to live up to their hype.

Most of the new global net outsourcing ventures purport to go beyond traditional one-stop shopping by building global private nets to provide users with high-quality, end-to-end international private-line services.

But the growing number of outsourcing ventures is raising the hackles of some carriers that say the consortia represent window dressing for the same services that carriers have been providing for years.

The outsourcing venture that has stirred critics the most is Syncordia Corp., a global private net outsourcing unit based in Atlanta that British Telecommunications PLC (BT) launched in September. At the formal introduction of Syncordia, BT Chairman Iain Vallance billed the unit as a bold new step into an emerging market.

BT is also courting Deutsche Bundespost (DBP) Telekom and Nippon Telegraph and Tele-

(continued on page 33)

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Circle Reader Service #107

Hughes criticizes Motorola plan for satellite frequency allocation

Says Iridium proposal is not an efficient use of the spectrum.

By Joanne Cummings
Staff Writer

WASHINGTON, D.C. — As the Department of State prepares to attend February's World Administrative Radio Conference (WARC) '92, at least one vendor is airing concerns about a U.S. proposal for frequency allocation relating to global mobile satellite services.

The U.S. proposal, which will be discussed at the conference, is just one of several expected proposals from various countries regarding spectrum allocation that, if adopted, will ultimately dictate the types of satellite-based mobile voice services available to users on a global basis.

But before WARC convenes in Torremolinos, Spain, U.S. officials are assessing concerns aired by Hughes Aircraft Co. about a Motorola, Inc. plan for frequency allocation that the State Department incorporated into its proposal.

Motorola's approach calls for the U.S. to set aside new spectrum frequencies to support its Iridium project, a low Earth orbit (LEO) system that would offer users mobile voice services using 77 satellites and portable handsets.

The State Department included Motorola's request in its frequency allocation proposal to the International Telecommunications Union in July.

But Hughes responded to a State Department request for comment on the issue of spectrum allocation by stating that the frequencies requested by Motorola should not be allocated because traditional geostationary Earth orbit (GEO) satellites can provide the same functionalities as Iridium without reallocating spectrum.

Until WARC decides on the particulars, the issue is still up in the air, according to a State Department spokeswoman.

Motorola has proposed that the U.S. set aside the 1,610- to 1,626.5-MHz and the 22.5- to 23.55-MHz radio frequency bands to support global mobile satellite services. Those frequency allocations will enable Motorola to deploy Iridium, which the company says offers mobile users greater reliability, better coverage and less propagation delay than traditional GEO systems.

Meanwhile, Hughes maintains that Iridium is an inefficient use of spectrum.

Steve Dorfman, president of Hughes' Space and Communications Group, said in an address at the recent Telecom 91 Exhibition and Forum in Geneva that the argument is "reminiscent of the debates of LEO vs. GEO that took place in the 1960s and ultimately led to today's array of geostationary communications satellites." He contends that now, as then, the best way to go is with a GEO system.

"We want people to know there are alternatives to Motorola's Iridium," said Emery Wilson, a spokesman for Hughes' Space and Communications Group. He pointed out, however, that Hughes has not put forth its own spectrum plan for consideration by the government. "We haven't gone that far," Wilson said. "We have just submitted a paper explaining there are alternatives to the Motorola plan."

Comparing LEO to GEO systems "is like comparing apples to oranges," said Lawrence Moore, a spokesman for Motorola's Government Electronics Group in Tempe, Ariz. "[Hughes is] talking about geosynchronous regional satellites; we're talking about 77 lower orbit satellites. We're talking about communicating via telephone-like handsets; they're talking about needing large dishes for relays. We're talking about worldwide coverage, and they're talking about limited coverage. It's a completely different situation."

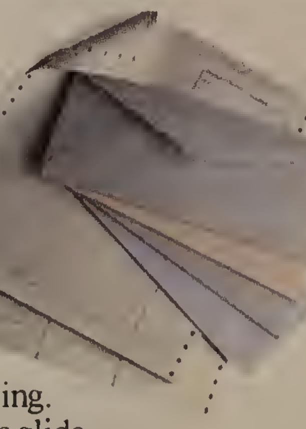
In its reply to the request for comment on Iridium, Hughes used a theoretical system called Tritium to illustrate its point, showing that a three-satellite setup could provide the global coverage and necessary functionality for a mobile system comparable to Iridium. However, Hughes did not elaborate on the particulars of this system by press time.

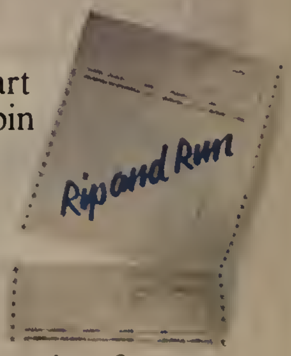
Motorola, in response to Hughes, published a comparative review of GEO and LEO satellite systems. In it, Motorola states that LEO systems, specifically Iridium, can provide better global coverage, service continuity and spectrum efficiency, as well as lower service delay and more system capacity, than a GEO system. It based this comparison on Hughes' Tritium theory as well as a modified version of Tritium that Motorola called Carbon, which uses a six-satellite configuration.

Motorola said neither the Tritium system nor the Carbon system would be able to provide service to areas above and below 70 degrees in latitude, for example. Iridium, on the other hand, would be able to cover the entire globe.

Also, in order to deploy mobile user handsets, a GEO system would sustain 400 to 700 msec of delay, while the Iridium system would suffer just 170 to 300 msec of delay.

A GEO system also has a high need for redundancy because one satellite covers as much as a third of the world. If that one satellite were to fail, one-third of the world





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NO U-TURN

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THE STRAIGHT-PAPER-PATH,

would be without service, Motorola said. With the Iridium plan, by contrast, each satellite covers a much smaller geographic area, so an outage would affect a smaller number of customers.

Motorola admitted that the project will require frequency allocation but said Iridium would provide more efficient use of the spectrum allocated. For example, the company said it could provide as many as 283,000 communications channels at a time, which would require 44 Hz of spectrum per channel. Tritium, on the other hand, could provide just 67,500 communications channels and would take 2,207 Hz per channel. The Carbon system would fare slightly better, offering 210,000 channels and using 67 Hz per channel.

Critics assail global outsource ventures

continued from page 31

phone Corp. (NTT) as partners in order to help Syncordia market services to multinationals in Germany and Japan ("BT's new Syncordia unit to offer one-stop global network shopping," *NW*, Sept. 23).

BT's competitors retort that Syncordia has been overhyped and brings little — if anything — to market that BT's competitors do not already offer.

"As we understand Syncordia, it's basically the same business under different names that MCI [International, Inc.] and AT&T have been competing for for years," said Seth Blumenfeld, president and chief operating officer of the MCI International unit of MCI Communications Corp. in Rye Brook, N.Y.

Substance and hype

BT claims that Syncordia will go beyond traditional one-stop shopping services by operating a global private net to provide international private-line services.

Whereas current one-stop shopping agreements only enable one carrier to obtain services from foreign carriers on a user's behalf, Syncordia will have end-to-end control of entire circuits subleased on its network, according to BT officials.

The officials argue that Syncordia will be able to offer bandwidth-on-demand services and service-level guarantees that other carriers can't match.

But Syncordia isn't the only entrant in this market (see graphic, page 31). For example, at the Telecom 91 Exhibition and Forum in Geneva last month, PTT Telecom Netherlands and Swedish Telecom International launched a new venture called Unicom, which will, among other things, provide global net outsourcing services that are virtually identical to Syncordia's offerings.

Unicom calls these services Global Managed Net Services. The company plans to provide them via an E-1 net linking 10 cities in Europe by mid-1992, according to Viesturs Vucins, president of Swedish Telecom International in Stockholm, Sweden. Unicom is seeking carrier partners in North America and Southeast Asia, and has talked with AT&T, MCI and US Sprint Communications Co. about the venture, he said.

DBP Telekom, France Telecom and MCI are also discussing a venture similar to Syncordia ("MCI eyes role in outsource net venture," *NW*, Oct. 28).

AT&T scoffs

Publicly at least, many carrier officials have dismissed these ventures as more hype than substance. They claim that BT is saying it can provide more with Syncordia than it is able to deliver. They also chide it for failing, thus far, to sign up partners.

"I don't know whether to call it Syncordia or Discordia," said Paolo Guidi, president of Sprint International in Reston, Va., referring to the fact that neither DBP Telekom nor NTT has yet agreed to join BT's outsourcing unit.

Richard Bodman, AT&T's senior vice-president for corporate strategy and development in Basking Ridge, N.J., added, "We're all looking to solve that [global private net] problem, but we, unlike BT, choose not to announce anything before we have it."

Many analysts doubt that the carriers will ever be able to form successful global private net outsourcing consortia because they are too self-centered and bureaucratic to cooperate effectively.

"They can't even get their one-stop shopping agreements to work; I don't see how they think they can take it to the next level [and operate global outsource networks]," said Daniel Briere, president of TeleChoice, Inc., a telecommunications consulting firm in Montclair, N.J.

Infonet to offer int'l SMDS across ATM net

continued from page 31

Infonet is also trying to upgrade and expand its existing X.25 network by replacing NCR Comten X.25 packet switches in 30 countries with packet switches from Siemens AG.

The company plans to finish the upgrade by March 1992.

In addition, Infonet plans to open Siemens nodes in 13 additional countries by the second half of 1992. The new countries include Argentina, Chile, Czechoslovakia, Greece, Israel, Nigeria, Saudi Arabia, the Soviet Union, Taiwan, Thailand and Turkey.

Moneton said the Siemens equipment will enable Infonet to support 56K and 64K bit/sec X.25 services throughout its network. Currently, the IVAN can only support 56K and 64K bit/sec X.25 services from a handful of nodes.

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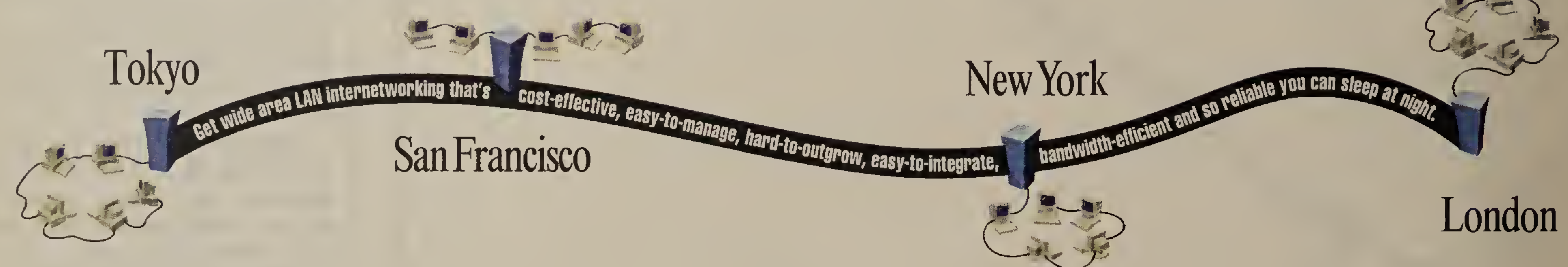
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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Xerox fax product now works with token ring

Xerox Corp. recently announced that its **LAN/Fax Express 21** product is now compatible with Novell, Inc. NetWare token-ring local-area networks.

Previously available only for NetWare running on Ethernets, LAN/Fax Express 21 consists of a Xerox Telecopier 7021 plain paper facsimile terminal, as well as LAN/Fax Express hardware and software.

The hardware is a small box that attaches the fax terminal and the token-ring LAN and acts as a fax server. The software must be installed in each personal computer or workstation on the network.

The product enables LAN-attached personal computer or workstation users to fax computer-generated documents from a pop-up window on their screen without exiting an application, such as a spreadsheet or word processing program.

The product's software includes more than 350 fonts and supports the Hewlett-Packard Co. LaserJet PCL page description language, as well as ASCII and PCX file formats.

Available now, the Xerox LAN/Fax Express 21 is priced at $7,515, which includes a Xerox Telecopier 7021 fax terminal, an RS-232-C interface, as well as LAN/Fax hardware and software.

Users that already own a Xerox 7020 or 7021 fax terminal can upgrade their machines and purchase the LAN/Fax Express 21 hardware and software for $3,495.

Xerox Corp., Xerox Square, Rochester, N.Y. 14644; (800) 832-6979, Ext. 521B.

Triticom introduces Ethernet bridge pack

Triticom recently unveiled Ethernet-to-Ethernet bridge software that is fully compliant with the IEEE 802.1d Spanning Tree Protocol (STP) specifications.

The company's **BridgeIT!** software allows end users or resellers to build their own Ethernet bridges by integrating standard, low-cost hard-

(continued on page 38)

New Stratus OLTP server offers increased capacity

XA/R Model 300 towers over prior RISC model.

By Joanne Cummings
Staff Writer

MARLBOROUGH, Mass. — Stratus Computer, Inc. recently unveiled a more powerful model in its XA/R Reduced Instruction Set Computer (RISC) line of transaction processing servers, which will eventually replace the vendor's XA2000 systems.

The XA/R Model 300 is designed to sit on an Ethernet or token-ring local-area network and field transaction requests from local or remote users. The new model offers 18.7G bytes of disk capacity and supports 1,500 asynchronous communications sessions, doubling the capacity of the XA/R Model 20, which was announced in March and is the only other member of the RISC product family.

The XA/R Model 300 can be linked to remote LANs over wide-area networks up to 64K bit/sec using IBM's Systems Network Architecture, Open Systems Interconnection, X.25 and Binary Synchronous Communications protocols.

The Model 300 is based on an Intel Corp. i860 RISC microprocessor that delivers 40 million instructions per second of performance. It contains fully redundant components to provide fault tolerance and continuous availability. The new server can be configured with a maximum of 256M bytes of memory and 18.7G bytes of disk storage. It comes with redundant power supplies, as well as redundant cartridge, reel-to-reel or media-compatible tape subsystems.

Stratus said adapters for linking the XA/R Model 300 to Ethernet or token-ring LANs are provided separately at a price of $4,000 and $4,500, respectively.

The Model 300 also offers hardware-based self-diagnostics and automatic fault reporting. If a component fails, the system can automatically dial up and notify Stratus' Customer Assistance Centers via its worldwide Remote Service Network, enabling Stratus engineers to investigate the problem and send out replacement parts to the customer.

The new model supports Stratus' FTX Release 2 operating system, which is based on Unix System V Release 4, as well as Stratus' proprietary VOS operat-

(continued on page 39)

Firm upgrades NFS pack for Macintosh networks

HERNDON, Va. — InterCon Systems Corp. recently announced an upgrade for its Network File System (NFS)-compliant file-sharing software that adds support for Apple Computer, Inc.'s System 7 operating system.

NFS/Share 1.1 uses the new features of System 7 to offer Apple Macintosh workstations access to NFS file servers, enhance control of AppleShare access privileges and provide faster operation than the previous version of NFS/Share.

Based on Sun Microsystems, Inc.'s NFS, NFS/Share 1.1 is software that resides on a Macintosh Plus or higher. It enables a user to invoke a command from the Macintosh's Chooser menu to access any NFS-compatible file server on an Ethernet network, an InterCon spokesman said.

With the upgrade, NFS/Share 1.1 now provides Macintosh users with remote access via the Internet to NFS file servers on another network. Using System 7's alias feature, for example, a local-area network administrator can replicate a local icon representing the routine needed to access a local NFS server. That icon is loaded onto a remote Macintosh, enabling it to establish a connection to the local NFS server via the Internet. The alias allows the remote user to access files as if it were locally attached.

The new version also enables Macintosh users to access multiple user groups and their files on the network. For instance, in a traditional NFS environment, users may have access to their own files, files within their default group and files in other groups of which they may be a member. Prior to Version 1.1, Macintosh users were only allowed to access their own files and files within their default group. With the new version, users can access files from all member groups.

In order to access all available groups, however, the server must be configured with user authenti-

(continued on page 38)

DEC's new mid-range printers

How they compare to DEC's previous DECprint offerings

Model	Interface	Pages per minute	Price
DEClaser 2100	Ethernet	4	$2,399
DEClaser 2150	Ethernet, AppleTalk	4	$3,499
DEClaser 2200	Ethernet	8	$3,599
DEClaser 2250	Ethernet, AppleTalk	8	$5,598
DEClaser 3200	Ethernet	13	$4,799
DEClaser 3250	Ethernet	13	$6,299
PrintServer 20	Ethernet	20	$19,495
PrintServer 40	Ethernet	40	$39,900

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

DEC targets printers at multivendor nets

DECnet, PC LAN users to benefit from sharing new printers, communications boards and drivers.

By Joanne Cummings
Staff Writer

MAYNARD, Mass. — Digital Equipment Corp. recently introduced a new generation of printers designed to be shared by users in a multivendor network.

DEC's new printers will enable users to eliminate the need to place work group printers in small local-area network clusters, enabling LAN workstations to make DECnet-attached printers available to a range of devices.

DEC said the new printers support its DECprint architecture, which enables them to be shared by DECnet workstation or terminal users as well as personal computers attached to LANs.

The company unveiled six new printers, including two mid-range network printers, as well as communications boards to link the printers to Ethernet and Apple Computer, Inc. AppleTalk LANs. DEC also unveiled new drivers that enable the printers to be accessed from within Microsoft Corp. Windows 3.0 applications. All the new printers can be accessed by users on VMS, Ultrix, OS/2, MS-DOS, Unix and Apple's Macintosh workstations, DEC said.

According to DEC, the new mid-range network printers fill a hole in its current DECprint line, which until now included low-end versions that could print as many as four and eight pages per minute and a high-end version that could print more than 40 pages per minute (see graphic, this page). The new mid-range units print 13 pages per minute, DEC said.

These printers include the DEClaser 3200 and 3250, which supports the industry-standard PostScript page description language. Both models offer one- and two-sided printing, serial and parallel interfaces, and support for ANSI's LN03 and Hewlett-Packard Co.'s LaserJet HP PCL-4 protocols.

Through a parallel interface, the printers can be connected directly to a personal computer running DEC's PathWorks software. This enables it to be accessed by any workstation linked to the personal computer in a DECnet network. Through the serial interface, the printer can be connected to a DECserver in a DECnet network, allowing it to be used by any workstation on the DECnet. An Ethernet board for connecting the printer with Novell, Inc. NetWare LANs is available as an option at a cost of $699.

The printers' LN03 and HP PCL-4 support enables applications running in Unix, VMS, OS/2, Macintosh and NetWare environments to access the printers, HP said.

The DEClaser 3200 comes configured with 1M byte of memory, upgradable to 6M bytes. Available now, the DEClaser 3200 costs $4,799. Users can buy a PostScript-compatible Upgrade Kit, which includes a PostScript board, 6M bytes of memory, a math coprocessor and documentation for $1,750.

The DEClaser 3250 offers all the features of the DEClaser 3200 but has 7M bytes of memory and includes PostScript support. It

(continued on page 38)

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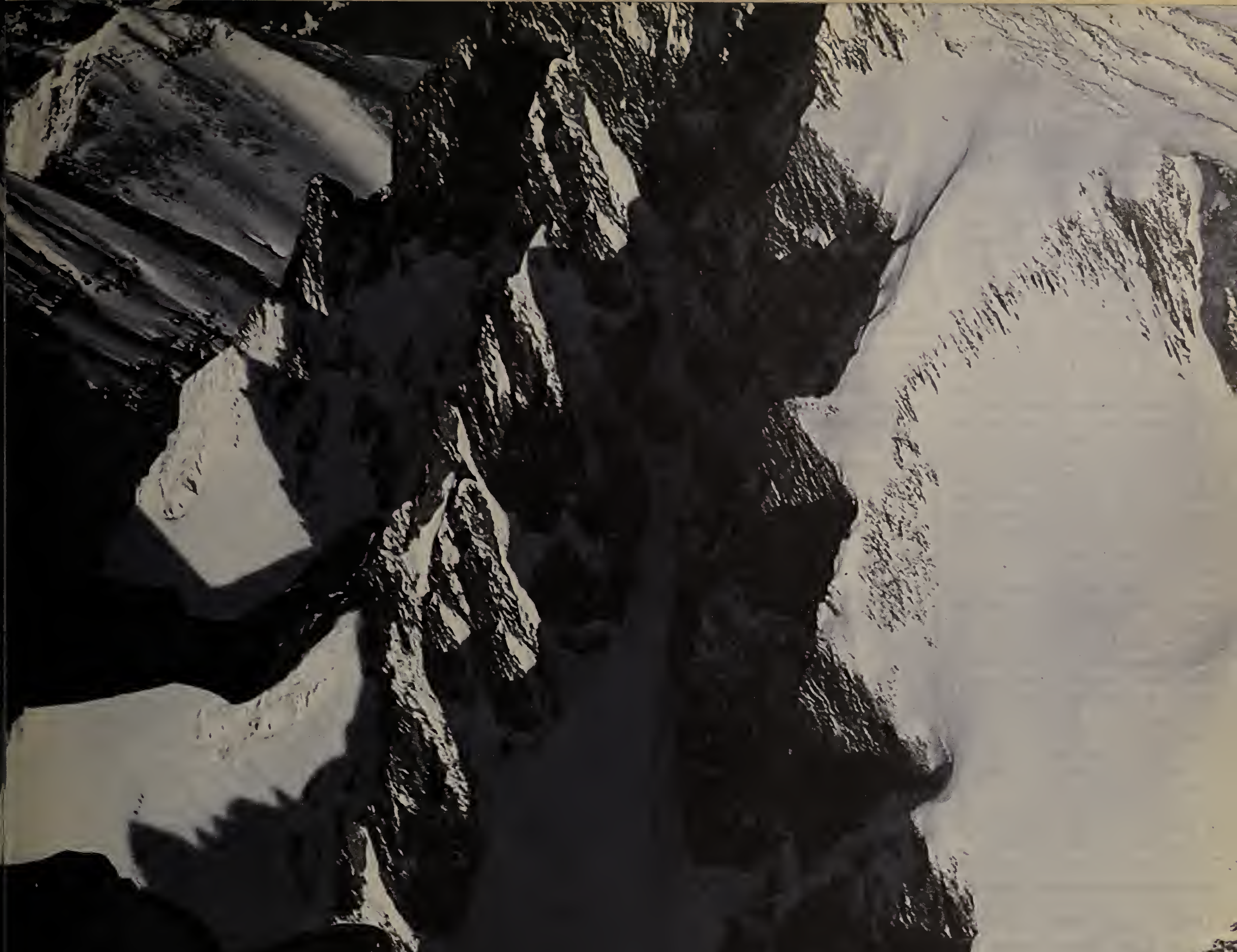

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DEC targets printers at multivendor nets

continued from page 35

can handle as many as 43 resident PostScript fonts, including 35 Apple LaserWriter fonts. This provides compatibility with more than 5,000 PostScript applications in VMS, Unix and personal computer environments as well as Apple LaserWriter applications, DEC said.

Available this month, the DEClaser 3250 costs $6,879.

DEC also unveiled three interface boards that enable its printers to tie directly to AppleTalk and Novell Ethernets.

The AppleTalk board fits into the DEClaser 2150 and 2250 printers and provides a LocalTalk interface that links the device to an AppleTalk net. Together with the DEClaser 2100, the 2150 and 2250 comprise the low end of DEC's DECprint-compatible laser printer line, producing fewer pages per minute than the 3200 and 3250 models.

The AppleTalk board also contains LaserWriter emulation software that makes the DEClaser printers appear as LaserWriter printers to users on Macintosh workstations. Macintosh users can access the DEC printers by using LaserWriter print menus, obviating the need for a second work group printer because Macintosh users can access it on a DECnet. DEC said it plans to offer the AppleTalk board for the DEClaser 3200 and 3250 printers but declined to provide availability dates.

DEC also offered two Ethernet boards. One board fits into the DEClaser 2100, 2150 and 2250 family. The other is designed for the DEClaser 3200 and 3250 printers. Each board offers both thin-wire and 10Base-T Ethernet interfaces for connecting to a NetWare 2.15 or NetWare 386 LAN. The boards enable the DEClasers to act as dedicated print servers on the NetWare LANs, DEC said.

Available this month, the AppleTalk board costs $299 and the Ethernet boards cost $699 each.

DEC also announced it is adding new software drivers to all its printers that allow users to print files to them from Windows-based workstations on an attached LAN. The software drivers will be available this month free of charge.

For more information, contact DEC at 146 Main St., Maynard, Mass. 01754, or call (617) 897-5111. ◼

Firm upgrades NFS pack for Mac nets

continued from page 35

cation software available from Sun or Beame & Whiteside Software, Ltd. A spokesman for InterCon said most NFS-compatible servers come bundled with that software.

Several file access features have also been enhanced under the new version, giving users more control over who accesses their files; previously this was a LAN administrator function.

For example, users can now change their own files' ownership, group and folder permissions directly from the Macintosh Finder menu. Also, users can now determine outside access privileges to their files in any NFS-supported folder or directory, whether it be Macintosh-, DOS-, Unix-, VMS- or MVS-based.

The new version features improved caching that provides 15% to 20% faster file access than the previous version. It also offers improved status monitoring so that when users load and unload remote applications, they are constantly apprised of the job status. This enables users to be notified immediately if there is a problem loading an application.

Like the previous version, NFS/Share 1.1 supports a variety of LocalTalk gateways. It also supports Ethernet adapters for connection to EtherTalk networks.

Available now, NFS/Share 1.1 costs the same as the previous version at $295 per node. Current customers will automatically receive an upgrade at no charge.

For more information, contact InterCon at 950 Herndon Pkwy., Herndon, Va. 22070, or call (703) 709-9890. ◼

First Look

continued from page 35

ware components, such as a personal computer and two Ethernet adapter cards, with the software package, rather than buying a full-blown hardware/software bridge package.

BridgeIT! is designed to work with any Intel Corp. 8088- through 80486-based PC-DOS or MS-DOS personal computer that has two of the following eight- or 16-bit Ethernet adapter cards installed: Gateway Communications, Inc.'s G/Ethernet-8 or G/Ethernet-16; Novell, Inc.'s NE1000 or NE2000; or Western Digital Corp.'s EtherCard Plus or EtherCard Plus16.

The two adapter cards, which do not have to be the same, allow the personal computer to be attached to two Ethernet local-area networks that need to be bridged.

Once installed in the Ethernet-attached personal computer, the software automatically learns the topologies of the LANs to which it is attached. It can then forward Ethernet packets from one LAN to another, the company said.

BridgeIT! can also display detailed statistics about the operation of its frame-forwarding functions, including current and peak forwarding rates, number of filtered frames and total number of frames. STP statistics are also displayed, including the identity of the STP root bridge.

Scheduled for availability on Nov. 15,

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Circle Reader Service #113

BridgeIT! is priced at $695 for a single-bridge license.

Triticom, Box 444180, Eden Prairie, Minn. 55344; (612) 937-0772.

Dayna offers SCSI Ethernet adapter for Macs lacking internal card slots

Dayna Communications, Inc. recently announced a small external Small Computer System Interface (SCSI) Ethernet adapter that enables users of Apple Computer, Inc.'s new PowerBook series of computers, as well as other Apple Macintosh computers that do not have an internal card slot, to connect to an Ethernet network.

The **DaynaPORT SCSI/Link** adapter measures 3 by 5¾ by 1¾ inches. It comes in two models, the DaynaPORT SCSI/Link and DaynaPORT SCSI/Link-T.

The SCSI/Link has a BNC connector for attaching to thin-wire Ethernet networks. The SCSI/Link-T has an RJ-45 connector for attaching to 10Base-T twisted-pair wiring systems.

Both models feature a 12-volt power supply and two 25-pin SCSI connectors for linking with the Macintosh. A 30-pin connector is also available, the company said.

Scheduled for availability in January, both models of the adapter are priced at $399 each.

The product is backed by a lifetime warranty and unlimited free telephone support for all registered owners.

Dayna Communications, Inc., 50 S. Main St., Salt Lake City, Utah 34144; (801) 531-0600.

NEC America enhances DSU/CSU, lets users run 19.2K over 56K line

NEC America, Inc. recently added a speed buffer mode to its data service unit/channel service units (DSU/CSU) that enables users to attach low-speed data terminal equipment running at up to 19.2K bit/sec to lines running at speeds as high as 56K bit/sec.

The mode was added to the company's rack-mountable **I5650E** and stand-alone **N500A** DSU/CSUs. The DSU/CSUs accept the low-speed traffic and enable it to pass over the 56K bit/sec lines, enabling users that may not yet require high-speed lines to install them now in preparation for future requirements.

The speed buffer mode lets users utilize a simple command on the DSU/CSU to designate the line for either high or low speeds.

The I5650E is designed for use in a digital data service network. It offers fully compatible signaling characteristics, and timing, format and control signal response. The DSU/CSU offers a choice of point-to-point or multipoint operation, advanced diagnostic capabilities, enhanced automatic line equalizer and simple installation procedures.

The I5650E/V.24 model supports line speeds of 2,400, 4.8K, 9.6K and 56K bit/sec, as well as EIA-232-C and the CCITT V.24 and V.28 standards. The I5650E/V.35 supports line speeds of 56K bit/sec and CCITT V.35 standards, while the I5650E/V.24+ operates at all the above rates plus 19.2K bit/sec. It supports EIA-232 and the CCITT V.24 and V.28 standards.

The N500A DSU/CSU is available in V.24, V.35 and V.24+ models. It supports the same features as the I5650E line but is not rack-mountable.

The enhanced DSU/CSUs are currently available.

The I5650E/V.24 is priced at $910, the I5650E/V.35 costs $1,070, and the I5650E/V.24+ costs $1,120. The N500A/V.24 is priced at $699, the N500A/V.35 at $820 and the N500A/V.24+ at $910.

Current users of the DSU/CSU models can obtain the speed buffer mode enhancement by purchasing a V.24+ interface for $125.

NEC America, Inc., Data and Video Communications Systems Division, 110 Rio Robles, San Jose, Calif. 95134; (408) 433-1279. ◼

Stratus OLTP server offers more capacity

continued from page 35

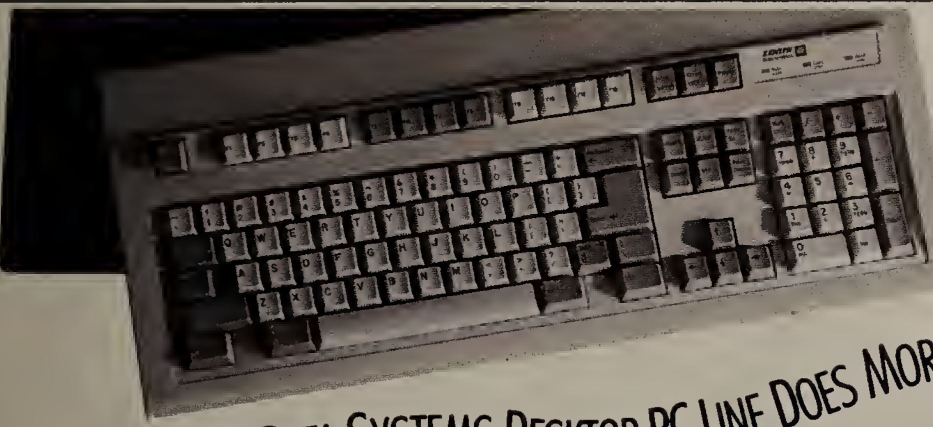
ing system, which is customized to run on-line transaction processing (OLTP) applications. This gives users a choice of operating systems, depending on their need to support open systems or OLTP functionality, a Stratus spokesman said.

The XA/R and XA2000 families are source code-compatible, meaning applications written to run on an XA2000 can run on an XA/R without modification, he said. Users can upgrade from XA2000 Model 75 and 85 to the XA/R line by exchanging CPU boards at a cost of $156,800.

The system supports software applications including those written for Sun Microsystems, Inc.'s Open Network Computing environment as well as relational database management system environments such as Oracle Corp.'s Oracle, Sybase, Inc.'s Sybase and Informix Software, Inc.'s Informix. Stratus said it will support the Open Software Foundation, Inc.'s Distributed Computing Environment next summer.

Available now, the XA/R Model 300 costs $343,000 for FTX-based systems and $388,000 for VOS-based systems.

For more information, contact Stratus at 55 Fairbanks Blvd., Marlborough, Mass. 01742, or call (508) 460-2000. ◼



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DEALING WITH END USERS

BY DARRELL ANDERSON

On being the Lone Ranger of net analysts

I often feel like the Lone Ranger of network analysts — the final salvation (or sometimes, scapegoat) of end users and the one who solves their dilemmas. I am all alone.

My goal is serving the end users on my network. I am occasionally amused at how I am seen by these end users, who can range from real power users to people on a dumb terminal doing mainframe inquiries.

These end users need my services for two reasons. The most common is to remedy a network problem that prevents or degrades their ability to communicate with something else, whether it be an application on the host or a file server on a LAN. The other is to give them a networking application to satisfy changing requirements in their job.

> I am occasionally amused at how I am seen by end users.

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For example, Sam is an end user who doesn't know me from Adam. When he has a problem, he calls the help desk, which takes care of the initial stages of solving his problem. After determining that its resolution requires more than just turning on the terminal or tightening the twisted-pair jack, the help desk refers the call to me.

When he is referred to me, Sam is still expecting a quick solution. However, it may take a few minutes or it may take a long time to resolve. Sometimes a quick fix is necessary. Sometimes Sam can get disgruntled if the time for repair exceeds his expectations.

There is no room for the fainthearted in this profession. In fact, quite often, while I am troubleshooting, innumerable and sometimes unmentionable comments exude from Sam's mouth — comments such as, "What's taking so long?" or "What's the matter, don't you know what you're doing?" Or my personal favorite, "Don't you realize I need to have this done by the end of the day?" Eventually, through dogged perseverance, I finish troubleshooting his problem.

Sam doesn't realize the intricacies between his terminal and the mainframe. Such factors as whether the problem affects other end users could mean a more extensive problem. Is the problem in the wiring, the terminal, the terminal controller and the host, or the application in the host?

Another situation I face is the development of new networking applications. This presents me with a great opportunity to exhibit my knowledge. Some group, usually a specific department, comes to me with a list of needs. They really don't know what they want, so I must quiz them for their requirements. They are seldom concerned with how much work is required; all they want to know is how long it will take to complete the project and how many great things they'll be able to do when it's finished. I guess that's just human nature.

The part of this whole scenario that really irks me is the phone call I will receive after the application is implemented and the end users are happily computing. Requesting an extension of the application's capabilities, which was not even mentioned before, the user will say in a condescending voice, "But you can work magic, can't you?"

I laugh nonchalantly. Then I go back to my lonely desk to face the task of possibly redesigning the entire network.

Sometimes it's a thankless job, but I still love it. Without end users, I would be a man without a network.

Anderson is a senior network analyst with The Toro Co. in Minneapolis.

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EDITORIAL

Recent FCC rulings leave users with questions

Although there's still time for rethinking, the Federal Communications Commission clearly has decided to take action on two controversial new areas: letting the telephone companies enter the television business and creating personal communications services — new cellular phone services that permit pocket-sized radio telephones.

Both votes were unanimous but, fortunately, preliminary because these FCC policies need to be clarified. Although the two ideas have merit in the long run, there are several reasons they'll hurt business network users in the short run.

If the phone companies really are zealous about transmitting TV to home users, they'll lay fiber to homes. Such high-bandwidth pipes might bring many consumers new applications, including telecommuting and videoconferencing.

Personal communications services have business implications for reducing telephone tag. Their role in transmitting data has yet to be explored, but their modems could be installed in laptop computers, helping to send messages and sales orders even when a personal computer isn't hooked to the physical network.

These are fine ideas. But the FCC's proposals are complicated, ambiguous and, in some cases, unfair.

For instance, the personal communications services proposal is unfair to existing network users. The primary portion of the spectrum that the FCC authorized for these services is the 1.8-GHz to 2.2-GHz band, which is already widely used in private microwave networks. This practice seems to deprive microwave users of their nets without compensation.

The FCC says it will also quickly license future efforts to develop services that employ unused frequencies, but the impact of this is unclear. After all, the FCC states that 1.8 to 2.2 GHz appears ideal for business and technical reasons, so developers are likely to follow the commission's guidance.

The TV proposal also has several flaws. For example, it is not known if it supersedes the contracts that municipalities had made with the cable companies. Also, it contains no provision to prevent the local exchange carriers from subsidizing their TV venture from their phone revenues.

The FCC's final rulings on both issues must clear up ambiguities and take action to block cross-subsidies. The priority of today's users is to retain quality local and access services. Fiber to the home and personal communications services are good ideas, but let's stick to fundamentals.

OPINIONS

REGULATORY AFFAIRS

BY ALAN PEARCE

FCC has rocky road ahead in streamlining AT&T rules

The Federal Communications Commission's long-term plans to streamline regulation of AT&T will stimulate prolonged, and probably bitter, court and congressional battles.

The commission's initial policy, which was controversial enough, was exacerbated by the FCC's approval of AT&T Tariff 12 offerings late last month and its report and order exempting interexchange carriers from telephone company/cable TV cross-ownership restrictions, an act that essentially abolished the restrictions imposed upon AT&T as long ago as 1970.

Not only will AT&T's competitors become involved in the upcoming fray, but users will get in on the act as well. AT&T won the support of large users in both the regulatory streamlining and Tariff 12 rule makings.

Major users want AT&T to have more flexibility in serving them. Small to midsize users see freeing AT&T as bad policy, fearing it will mean eventual doom for competition. Ironically, both of these conflicting views could be correct.

In addition, FCC Chairman Alfred Sikes plans at least two more phases of regulatory streamlining.

Phase 2 will give AT&T regulatory relief for inward services in the price cap plan's Basket 2 category, which comprises 800 and 900 services. Implementing this phase will depend on the introduction of 800 portability.

Phase 3 will abolish, or at least modify, the rules imposed by the Second and Third Computer Inquiries, which require AT&T to unbundle the prices of basic services from enhanced services and customer premises equipment.

Under current FCC rules, AT&T can offer packages containing both basic and enhanced services, but it must price each separately so that the customer and AT&T's competitors will know exactly how much each component costs.

AT&T can also offer users packages that include both services and customer premises equipment, but in the tariff it files, the company must price each independently of the other. The FCC requires this unbundling so that users and AT&T's rivals can determine whether AT&T is behaving anticompetitively, for example, by giving the user too big a break on the customer premises equipment or perhaps trying to hide the fact that it is pricing basic and enhanced services below cost.

> It's possible that an unleashed AT&T could indulge in a price war that only it could win.
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If Sikes successfully implements his streamlining plan, the resulting changes in the basic ground rules of competition will create tremendous opposition from both competitive long-haul service providers and equipment manufacturers.

Although the FCC seems bent on proceeding with its efforts to give AT&T some regulatory relief, the agency has thus far avoided some tough questions:

■ **How much competition is enough?** Clearly, the three dominant carriers in long-haul services — AT&T, MCI Communications Corp. and US Sprint Communications Co. — may be locked in fierce competition today, but will that rivalry continue to thrive if AT&T is given more regulatory streamlining?

It's possible that an unleashed AT&T could decide to indulge in a price war that only it could win. In that case, the competition could be destructive, causing a situation similar to what has been happening in the airline industry — a brief period of intense and destructive competition followed by consolidation and concentration, which is not good news for users.

■ **How much ratepayer protection is needed?** Title II of the Communications Act of 1934 calls for protecting ratepayers — at all costs.

So the FCC must figure out how to strike a balance between streamlining regulation and protecting the ratepayer. It may be that the FCC simply cannot strike that balance unless the act is changed, giving the agency more regulatory flexibility.

■ **What are the limits of the act's flexibility?** Critics of the FCC and AT&T contend that the act does not give the FCC the regulatory and policy-making flexibility it has seized by instituting its plans to streamline AT&T regulation. An appeals court may resolve this issue.

A lot is at stake here. If AT&T can achieve its stated goal of shifting its largest and most lucrative customers from tariffs to secretly negotiated, proprietary contracts, then the carrier could capture large user companies by setting low prices — outside of any public or government scrutiny — that its competitors couldn't match. If that happens, U.S. policies that have attempted to stimulate long-haul competition for more than 20 years will have come to naught.

The FCC must adopt a carefully planned, phased approach that will allow it and its critics time to assess and analyze the implications of giving a telecommunications giant such as AT&T more competitive thrust.

In the final analysis, it may be left to the courts or Congress to determine how much business and regulatory freedom to give AT&T. From today's perspective, the FCC wants to let AT&T rip, while the Congress wants to restrain it. ◘

Pearce is president of Information Age Economics, Inc., a telecommunications research firm in Washington, D.C.

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TELETOONS

BY FRANK AND TROISE

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Phil Frank

LETTERS

No gov't role in public net

Your editorial "AT&T outage shows public network vulnerability" (*NW*, Sept. 30) properly brought to readers' attention a serious problem in the public network. However, I found your conclusion rather chilling: "But one point this outage makes clear is the need for the federal government to step up efforts to guarantee the reliability of the public network."

I find this a very unfortunate conclusion for several reasons.

First, the government has no mandate to guarantee the reliability of the public telecommunications network. Our government has grown to the point where its size is on the verge of strangling the entire economy. And you would suggest that we give it another task?

Second, the government has no motivation to guarantee the reliability of our network. Forgive my cynicism, but the government is in the business of getting reelected and spending money.

Third, the government can*not* guarantee the reliability of the network, nor can anyone else. Can reliability be proved? Of course. Guaranteed? Impossible.

Finally, the government has yet to demonstrate its ability to do anything very well (except the above-mentioned spending money and getting reelected). Our public schools are in a state of disarray. Our highway system is crumbling. Our courts have a backlog years long. The post office is slow and expensive. Social security is on the verge of bankruptcy. Medicare is permeated with fraud.

If the government attempted to guarantee the reliability of the network, one or more of the following would happen: Prices would increase,

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Turning the network into the computer

"The network is the computer" has become a popular way of describing client/server computing and its related technology, distributed processing. But the difficulty that users and software vendors have in writing applications for these different computing models is preventing this catchphrase from becoming a reality.

Client/server computing is a framework for computers to access data, processing power, storage devices and other services across the network. An example of a common form of client/server computing is a spreadsheet on a microcomputer requesting data from a database on a local-area network server, mainframe or minicomputer.

The original client/server model, in which diskless microcomputer clients are entirely dependent on servers, has been broadened considerably over the past five years.

In addition to computers simultaneously filling the roles of client and server, individual applications running on them can also be clients and servers.

For example, a peer-to-peer network of high-powered Unix workstations can perform client/server computing. An application running on one workstation can request a service from an application running on a second workstation, while, at the

(continued on page 48)

Smalley is a Boston-based free-lance writer.

The future belongs to client/server computing and distributed processing, but a lack of programming tools is preventing users from getting there.

By ERIC SMALLEY

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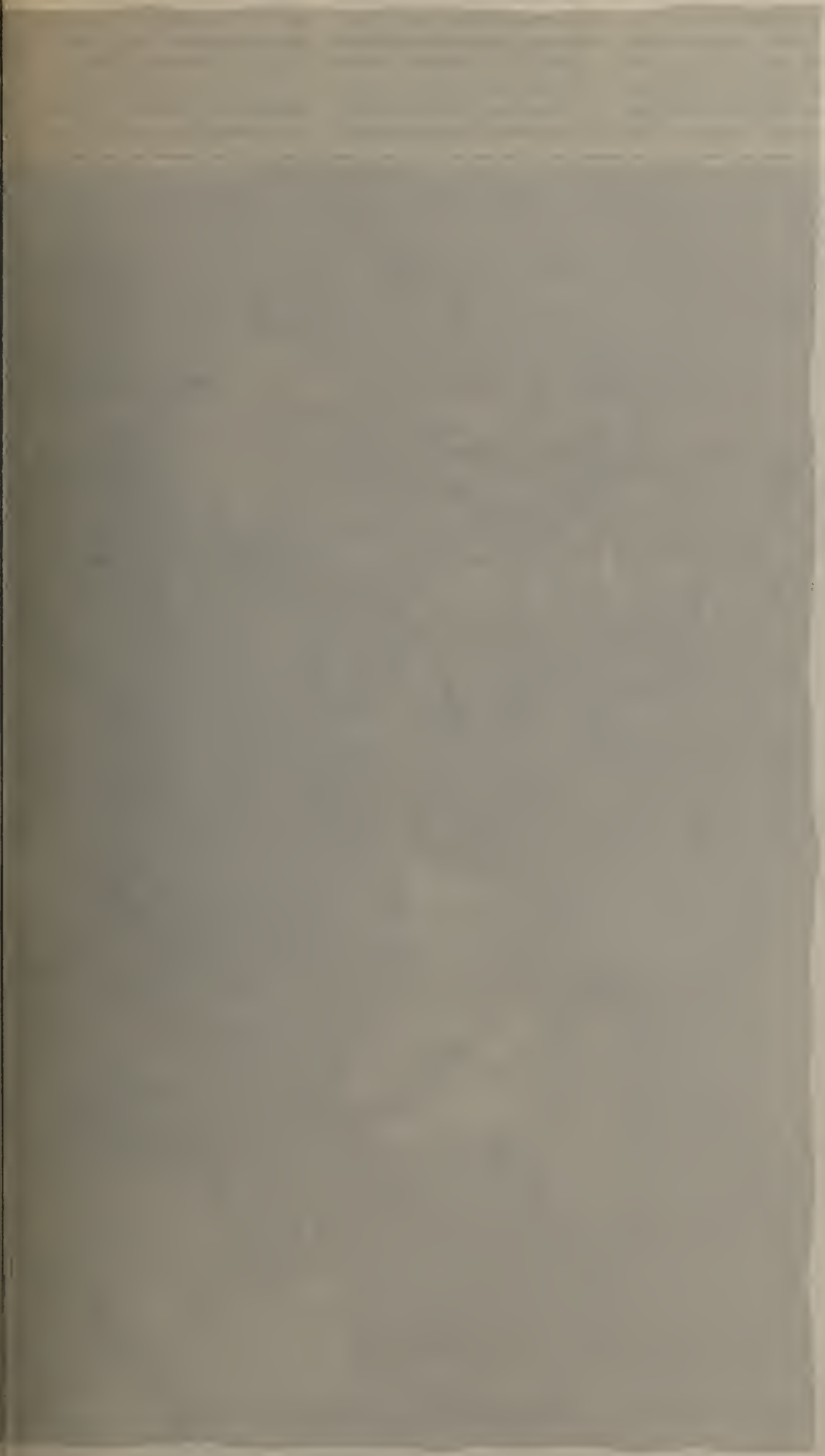

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(continued from page 45)

same time, a third application running on the second workstation can request services from a fourth application running on the first workstation.

Many implementations of the client/server architecture require end users to compile a request for service and ship the request across the network to the target server.

By contrast, distributed processing describes a more specific framework in which applications are divided into portions, which are processed on different computers on the network. These application portions exchange messages when one needs data or functions from another.

Distributed processing can utilize the client/server architecture. However, the underlying client/server relationship in distributed processing applications is generally further removed from the user than it is in traditional client/server applications (see Figure 1, page 50).

Distributed processing is similar to parallel processing. The main difference is that, in parallel processing, an application is handled on multiple CPUs within one computer, while in distributed processing, an application is handled on multiple computers.

Distributed processing is necessary for the net to "become" the computer.

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In many distributed applications, the presentation and user interface elements are processed on microcomputer or workstation front-end systems, while the data handling and computational elements are processed on mainframe and minicomputer back-end systems.

IBM's Cooperative Processing is an example of this form of distributed processing. Cooperative Processing defines the interaction of OS/2-based microcomputers and IBM mainframes.

Distributed processing is necessary for the network to "become" the computer. If the network is viewed as a multiprocessing computer, then distributed processing is the means of running applications across those processors.

But while industry experts agree that distributed processing and client/server applications will play an important role in the future of computing, how do you develop such applications? What new problems are posed for software developers? What tools are out there to help them?

"There is a level of frustration" among users, says Tom Willmott, vice-president of Aberdeen Group, Inc., a consulting and market research firm in Boston.

"Customers are told distributed processing is the way to go, but they can't get there from here yet. They're buttoning their wallets and waiting for nirvana to appear," he says.

Building applications

It will be two to three years before distributed processing technology is available widely enough for users to build distributed application as easily and cost-effectively as they can build applications for stand-alone computers, Willmott says.

However, for software developers and systems integrators with considerable programming expertise, developing distributed applications today is not an insurmountable challenge.

"The client/server mind-set is different than the single machine [mind-set]," says Michael Lorton, senior computer specialist with Systems Research & Applications Corp. (SRA), an Arlington, Va.-based systems integrator. "You have to be aware of it, but it doesn't dominate your design. Everything is a little different."

There are several techniques for building distributed applications. One of the most common

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methods is to build applications on top of database management systems that support the SQL standard, which defines a means for accessing relational DBMSs. Using SQL, database queries can be sent by client computers across the network to remote database servers.

However, building applications that do more than database queries on computers across the network has been accomplished for the most part using remote procedure call (RPC) technology (see Figure 2, page 50).

RPCs allow an application on one computer to transparently initiate a process on another computer over the network. RPCs mimic standard procedure calls that application developers use to enable an application running on a computer to access, for instance, a disk drive attached to the same computer. In theory, RPCs shield the application developer from the intricacies of the network.

Some users have latched onto RPCs as a way to build distributed applications. Modular Mining Systems, Inc. of Tucson, Ariz., used Sun Microsystems, Inc.'s Open Network Computing (ONC) — a set of application development tools that includes an RPC — to build a distributed dispatching application.

The application links central computers to a radio network used for dispatching trucks in open mines.

The application uses ONC to manage database access and the interface to the radio network, says Jonathan Olson, Modular Mining's vice-president of software engineering.

"ONC handles the client/server network quite well," he says. "It allows real-time database access without any kind of record locking. Having one server that manages writes to the database is more efficient than [record] locking."

Message passing

Despite playing a central role in the movement toward distributed applications, RPCs are not cutting-edge technology. They have existed for decades, and some of the more complex distributed processing applications are running into the limitations of the technology. RPCs offer relatively low performance and require the client and server to establish a session-layer connection.

Instead, the technology many industry observers say represents the future of distributed processing is object-oriented message-passing schemes.

Some users have latched onto RPCs as a way to build distributed applications.

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Message-passing schemes, not to be confused with store-and-forward messaging systems for electronic mail, make it easy for programmers to shuttle data between computers running different operating systems and using different network connections.

Unlike RPCs, message-passing schemes allow applications or portions of applications to communicate across heterogeneous systems through shared memory, usually referred to as a software bus.

Programmers only have to use a single application program interface (API) to connect objects, which can be loosely viewed as a collection of data and instructions on how to process that data, to the message-passing system. A message server maintains the software bus, makes necessary conversions to pass messages to the target system and manages the message queue.

Instead of requiring a session-layer connection between the client and the appropriate server, systems establish a low-level connection to a message server, which places the message in a

(continued on page 50)

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queue until it can be forwarded to the object receiving the message.

"Ideally, distributed processing will be message-based rather than [based on] RPCs," according to Aaron Zornes, vice-president of the META Group, a market research firm based in Westport, Conn.

Advanced message-passing schemes can provide a resource directory for objects, whether they are network nodes or discrete applications, allowing them to access services without requiring a knowledge of where these services reside, he says.

Comparing two computing models

Figure 1

Distributed processing	Client/server computing
☐ Means of running applications on multiple computers across the network.	☐ Model for giving computers and applications access to services across the network.
☐ Uses RPCs and object-oriented message-passing schemes.	☐ Uses SQL and RPCs.
☐ Can follow client/server or object-oriented models.	☐ Can be applied to computers, applications or portions of applications.

RPC = Remote procedure call

Distributed processing and client/server computing are related concepts that allow software developers to build applications for networks, not just Individual computers.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

Message-passing schemes will also make it easier to assess network costs and perform network load balancing, where portions of applications are processed on available nodes, Zornes says.

An example of a message-passing scheme currently on the market is Digital Equipment Corp.'s DECmessageQ, which is part of the company's Application Control Architecture.

In addition, the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) and object-oriented Distributed Management Environment are evolving to provide basic message passing among objects.

Furthermore, the Object Management Group last week released a specification called the Object Request Broker that defines a means for applications to communicate across different operating systems and networks.

Vendor priorities

Whichever underlying technology is involved, vendors are making baseline distributed processing a major priority. They are also working to make APIs and connection scenarios as automatic as possible so users aren't faced with choosing one of several proprietary distributed processing schemes, the Aberdeen Group's Willmott says.

Although there will be some standardization of this technology over time, it is unlikely there will be only one implementation even three to five years from now, and distributed processing standards will probably resemble the 802.3, 802.4 and 802.5 LAN standards, Willmott adds.

The distributed environment

Network managers may be getting a handle on how to build networks to support distributed processing and client/server, but application developers are still struggling with the relatively unfamiliar distributed environment.

Problems posed for programmers working in such an environment include multiprocessing, application partitioning and the lower level of reliability compared with single computers.

By definition, distributed processing is a form of multiprocessing, whereby tasks are executed across separate machines instead of tightly coupled processors. However, there are two distinct multiprocessing approaches: the concept of client/server as one server to many clients, and true peer-to-peer multiprocessing, with a potentially unlimited number of systems that can provide as well as receive services from other systems.

"Today's client/server tools don't address peer-to-peer relationships, which is where we want to be," the META Group's Zornes says. "It's a whole new paradigm of logic when you move away from the many-to-one notion of client/server to peer-to-peer."

Leaving behind the rigidly defined roles of clients and servers promises greater flexibility and power for distributed applications. Returning to the metaphor of the network as a computer, it also results in a more complex platform for developing applications.

The number of problems increase exponentially with the number of systems in a true multiprocessing scheme that has an arbitrary number of CPUs, SRA's Lorton says. Not only does the number of network connections increase, but the application becomes dependent on a greater number of computers.

The largest concern for developers is ensuring that the program takes into account when a partner machine is unavailable, he says.

"For example, if a user has updated a record and the server goes down, did [the server] get the update? How do you tell the user?" Lorton asks. "Any time a machine goes down, you're in an unknown state."

In a distributed application, the amount of work done at the point of a crash ranges from all of it to none of it. "In the worst case, the server will go down and the user will be unaware of it and keep working," he adds.

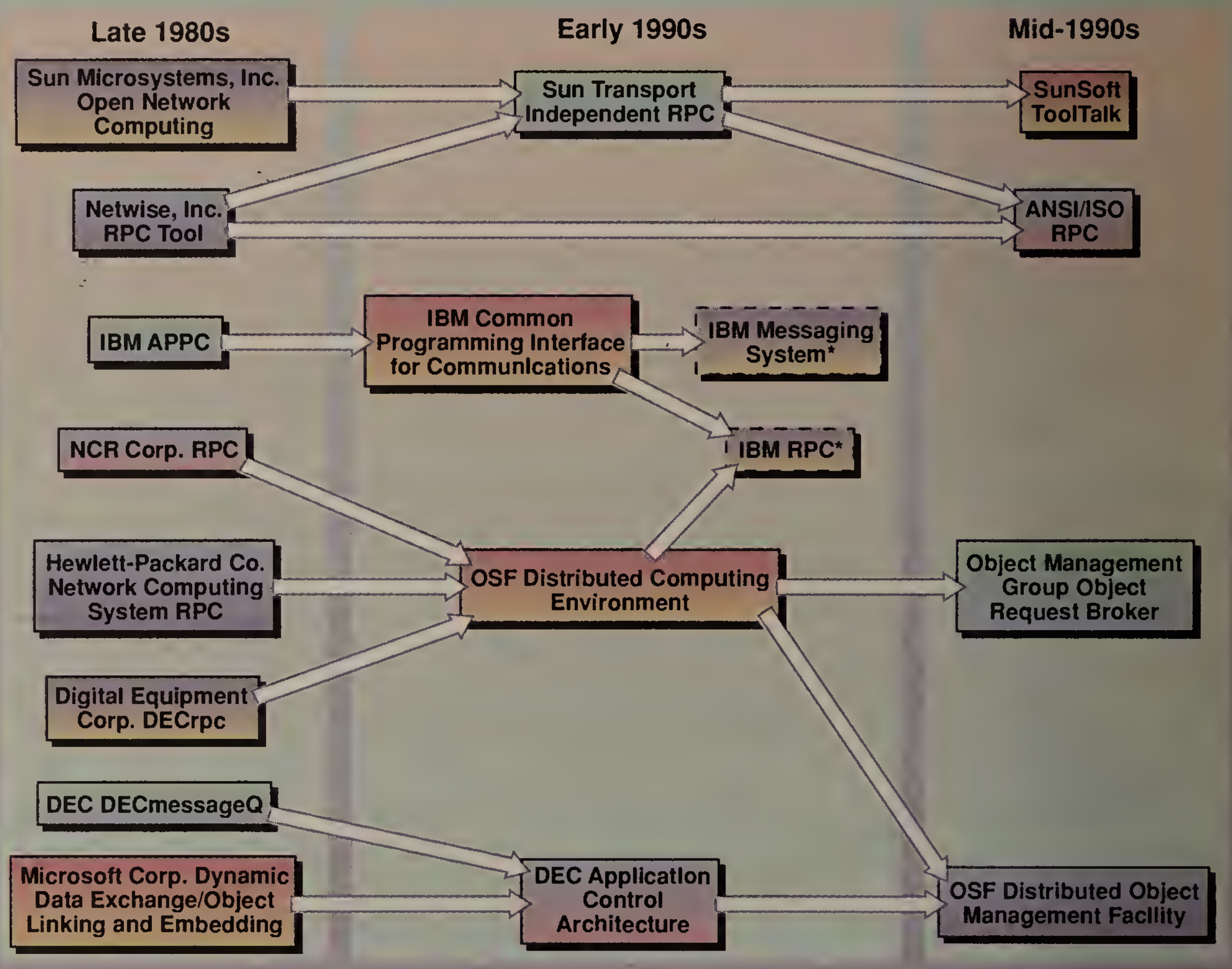
Distributed systems involve not only multiple machines, but also the relatively volatile network links between them.

"No matter how good your communications infrastructure is, it's not as deterministic as a nondistributed environment," says Michael Prince, director of information services for Burlington Coat Factory Warehouse Corp. in Burlington, N.J.

One means of providing a more reliable platform for distributed applications is to have more than one host provide each service, he adds.

The evolution of RPCs

Figure 2


Late 1980s
Early 1990s
Mid-1990s
Sun Microsystems, Inc. Open Network Computing
Sun Transport Independent RPC
SunSoft ToolTalk
Netwise, Inc. RPC Tool
ANSI/ISO RPC
IBM APPC
IBM Common Programming Interface for Communications
IBM Messaging System*
IBM RPC*
NCR Corp. RPC
Hewlett-Packard Co. Network Computing System RPC
OSF Distributed Computing Environment
Object Management Group Object Request Broker
Digital Equipment Corp. DECrpc
DEC DECmessageQ
Microsoft Corp. Dynamic Data Exchange/Object Linking and Embedding
DEC Application Control Architecture
OSF Distributed Object Management Facility

*To be announced
OSF = Open Software Foundation, Inc.
RPC = Remote procedure call

RPC technology Is expected to evolve to object-based messaging systems, with a few standardized RPCs providing underlying connections.

GRAPHIC BY SUSAN SLATER

SOURCE: THE META GROUP, WESTPORT, CONN.

"It's important to have a service redundantly available on the network, particularly in the [online transaction processing environment]," Prince says. "You need to build in flexibility to deal with the uncertainty of a service being accessible."

Partitioning

One of the most basic tasks for a programmer building distributed applications is partitioning an application so that different portions are processed on different computers. The most common form of partitioning involves separating the user interface elements from an application and running them on a client workstation, and separating the computational or data-handling elements and running them on a server.

This form of partitioning is suited to client/server applications based on SQL databases. But the more complex the distributed processing scheme, the less suitable this simple partitioning becomes.

"Today's graphical user interfaces don't adapt well to the RPC model," Zornes says. "Does each movement of the mouse equal an RPC? How much of the application logic sits where?"

If most of a distributed application resides on a back-end system, the complex manipulations made possible by a GUI can result in a large number of RPCs. On the other hand, if most of the application resides locally on the workstation, the benefits of distributing the application are limited.

While partitioning allows applications to be processed on more than one machine, it is multithreaded processing that will enable programmers to take advantage of distributed environments.

Multithreaded processing, also called asynchronous processing, allows a program to send out a request to a server and then begin another task before the results of the request are returned. Programming for stand-alone computers has traditionally been step-by-step, meaning the computer must wait for results of a request before it can continue processing.

The need for asynchronicity

"To take advantage of idle desktop [million instructions per second] you want asynchronicity," Zornes says. "If you do get asynchronicity — if your program can do other things [while it's sending a request out to a server] — you have a new mindset. You can rearchitect applications into discrete processes."

However, few tools for developing asynchronous applications are currently available, he says.

"Our near-term problem is the availability of an RPC product that supports multiple threads," says Craig Brumfield, senior systems analyst with McDonnell Douglas Electronic Systems Co., a Colorado Springs-based system engineering and application development firm.

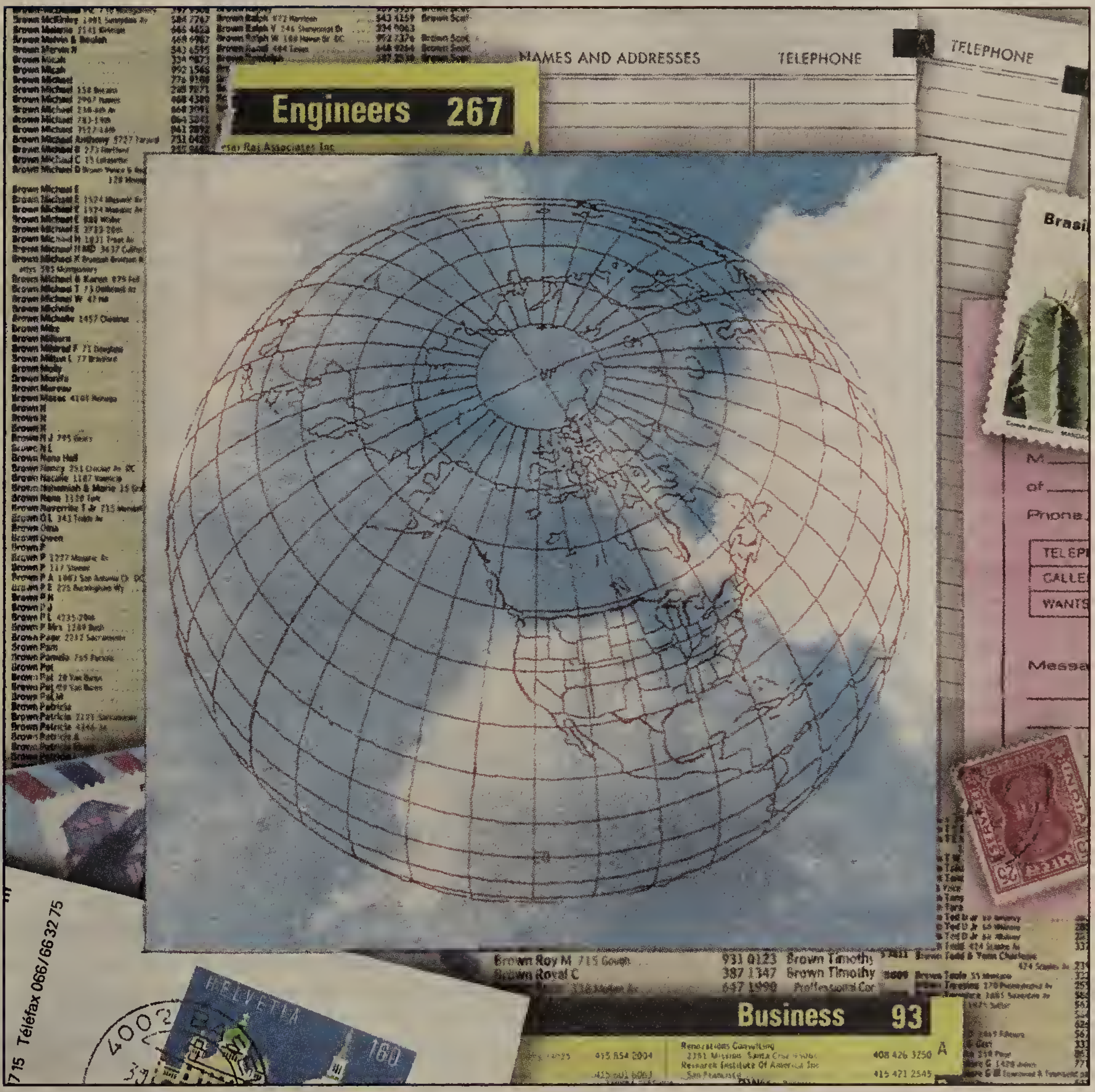
Brumfield said he is looking forward to the release of the second version of Hewlett-Packard Co.'s Network Computing System RPC, which will support threads.

The RPC in the OSF's DCE, officially released in September, will also allow McDonnell Douglas to break its program into separate Unix processes with shared memory, as opposed to develop-

(continued on page 66)

Plotting a direction for X.500

By interconnecting carrier directories, the North American Directory Forum hopes to bring X.500 benefits to users.



The day when a user can consult X.500 Directory services to learn the electronic mail address of another user is coming a little closer to reality.

The North American Directory Forum (NADF), an organization of telecommunications carriers and information service providers, earlier this year reached a fundamental consensus on the shape of X.500 interconnection among the directories of its members. This interconnection will allow private network users to share directory information more easily with their trading partners as well as between their own geographically dispersed sites.

In addition, the NADF announced its intention to launch an experimental pilot next spring that will pave the way for its member organizations to offer public directory services. When available, these services are expected to promote widespread industry acceptance of X.500 and greatly advance usage of open systems applications such as X.400-based E-mail and electronic data interchange. (For a list of vendors with X.500 products either in development or already released, see Figure 1 on page 52.)

Blum is a principal at Rapport Communication, an education and consulting company with offices in Takoma Park, Md., and Washington, D.C. He teaches X.400, X.500 and multivendor network management seminars and is a former editor for the National Institute of Standards and Technology's OSI Implementors Workshop X.500 special interest group.

The establishment of generally accessible public directory services by public messaging service providers is key to user acceptance of X.500 because, although three years have elapsed since the X.500 Directory services standards were issued, global directories have remained elusive. X.500 defines a model of a global Directory Information Tree (DIT), wherein any X.500 user worldwide can access information, subject to access control.

In practice, the DIT will be a vast distributed database interconnecting the directories of a mixture of user organizations, information service providers and carriers, many of whom are competitors.

Seamless interconnection of multiple directories via X.500 cannot occur by fiat of the International Standards Organization or the Consultative Committee on International Telephony and

(continued on page 52)

By DANIEL BLUM

ILLUSTRATION ©1991 LAURA TARRISH

(continued from page 51)

Telegraphy. Rather, it remains hostage to a host of security, performance and commercial quandaries. Until public service providers interconnect their directories, X.500 may not go far.

Large companies with private networks will soon be able to reap benefits from synchronizing their multiple internal directories using X.500. But the real prize will only arrive when E-mail and other service providers enable users to issue a single query that searches multiple public directories for information about users on external networks.

Directory services in North America will enable E-mail and EDI users to explore enterprise, national and global directories, thereby locating potential correspondents or companies providing needed goods and services. This ability will promote increased levels of information sharing and trading among organizations and deepen the interoperability currently fostered through public E-mail interconnection using X.400.

Implementation of X.500 will likely parallel that of X.400. Before users began installing X.400 gateways to the outside world, public E-mail providers had to interconnect their services to provide an international backbone messaging network.

Thus, NADF's efforts are essential to bringing users the benefits of X.500. Although the forum now has a counterpart called the Expert Group on Directories under the European Workshop for Open Systems (EWOS), NADF remains the first organization of its kind to specifically address practical arrangement for public X.500 Directory interconnection and the closest to establishing an interconnection landmark.

Until public service providers interconnect their directories, X.500 may not go far.

▲▲▲

Indeed, NADF's establishment in January 1990 constituted the first evidence that public service providers were willing to cooperate in building widespread X.500 Directory interconnection.

“The original members felt strongly that it was in their interest to accelerate the acceptance of X.500 and that this could only come about under the auspices of a group within which the public service providers could work together directly,” says Theodore Myer, a principal at Rapport Communication, who acts in a consulting role to NADF.

X.500 product vendors

Figure 1

Company	Product status
Alcatel TITN, Inc.	Released
AT&T	Under development
Control Data Corp.	Under development
Data General Corp.	Under development
Digital Equipment Corp.	Under development
Frontier Technologies Corp.	Under development
GSI-Danet, Inc.	Under development
Hewlett-Packard Co.	Released
Honeywell Bull, Inc.	Released
IBM	Released
ICL North America	Released
Incotel, Inc.	Under development
NCR Corp.	Released
OSIware, Inc.	Released
Prime Computer, Inc.	Under development
Retix	Released
Siemens Nixdorf Information Systems, Inc.	Released
Soft-Switch, Inc.	Under development
Sun Microsystems, Inc.	Under development
Touch Communications, Inc.	Under development
Unisys Corp.	Released

Releases encompass end-user products and technology transfer and preproduction beta programs. Other vendors and service providers not listed may have X.500 products under development.

GRAPHIC BY SUSAN SLATER

SOURCE: RAPPORT COMMUNICATION, TAKOMA PARK, MD

NADF is open to organizations that currently operate public X.400 administration management domains or have stated an intention to operate public X.500 administration directory management domains. Organizations operating administration management domains are licensed to operate public services and include long-distance carriers, regional Bell holding companies and various information service providers.

An additional criterion for NADF membership is the service provider's willingness and intention to intercommunicate with other service providers. (Figure 2 on this page provides a current roster of NADF members.)

NADF's principal goal is to create agreements between X.400 service providers on an infrastructure for interconnecting their directories. NADF members may later support the creation of X.500-based telephone directories, which have not yet been defined.

On the E-mail front, each NADF member will provide a separate public directory facility tied to its own value-added service. Each service provider will follow NADF agreements to interconnect its directory with those of other public service providers. Together, these public directory facilities will constitute a virtual public directory users can access to obtain information.

Before establishing interconnected public directory services, NADF members must complete agreements on various technical and service issues. These agreements will build on the 1988 CCITT/ISO X.500 Directory standard itself, the CCITT's additional F.500 Recommendations for public directory services, and the Stable Implementation Agreements on X.500 drafted by the National Institute of Standards and Technology's OSI Implementors Workshop. In some cases, the agreements may anticipate functionality the CCITT and ISO are currently standardizing in the 1992 version of X.500.

NADF plans to lay the groundwork for public directory services by helping its members establish and interconnect X.500 Directory systems as well as perform interoperability testing. The timetable calls for four phases: an experimental pilot phase, a technical testing phase, a commercial testing phase and a full commercial service phase.

The experimental pilot commencing next spring is geared at validating NADF-developed concepts and gaining practical operational experience with X.500 interconnection. The technical testing phase can be thought of as an alpha test that does not involve actual users.

Once an interconnected service is fully debugged, NADF will start a commercial testing phase that includes user beta test sites. The beta test users will not be charged for directory access during the testing phases, but service providers will be testing their accounting and settlement procedures. During the commercial service phase, public directories will be generally available and users will be charged to access those directories.

For the sake of consistency, public service providers serving a community or organization must acknowledge common naming and registration procedures as well as a common knowledge, or directory routing information, base. Such common registration procedures would ensure, for example, only one organization unit entry exists for “International Sales” within the “Ultimate Widget Corp. organization,” while the common knowledge base will act as a pool of shared references for rating queries in the proper direction.

Registration and knowledge issues are critical. Although the design of the DIT is established in the standards, there are problems with implementing the model in a commercial environment. Left alone, each service provider tends to list any and all information used by its subscribers.

For example, if one X.500 Directory service provider furnishes Ultimate Widget's internal E-mail user listings and another its telephone directory listings, the service providers might list some entries twice. This situation is known as a distributed entry scenario and can result in partial or possible conflicting information being listed in either directory.

The X.500 model, which assumes a single, complete and unique entry for each information object, crumbles at this point. External users querying for information about correspondents at Ultimate Widget would not always get the same answer.

Current members of the NADF

Figure 2

- AT&T
- Bell Atlantic Corp.
- Bell Communications Research (representing US West, Inc.)
- BellSouth Advanced Networks, Inc.
- BT North America, Inc.
- GE Information Services
- IBM
- Infonet Services Corp.
- MCI Communications Corp.
- Pacific Bell
- Performance Systems, Inc.
- Southwestern Bell Corp.
- Sprint International
- U.S. Postal Service
- Ziff Communications Co.

SOURCE: RAPPORT COMMUNICATION, TAKOMA PARK, MD
GRAPHIC BY SUSAN SLATER

NADF's solution calls for a pool of shared references that associate organizations or communities with the service providers that maintain their public or private listings. This shared reference pool, a copy of which would be held by each of the service providers, acts as a public name space, or common knowledge base.

The public name space embodies knowledge about which information is held in which service providers' directory. The public name space also contains pointers, called naming links, that help users locate where the parts of a distributed entry reside.

NADF's goal is to create agreements between X.400 providers on an infrastructure.

▲▲▲

To pursue a remote query, an X.500 Directory System Agent (DSA), or server, would contact any of the public directories to obtain a reference to the DSA in which the desired information is stored. This target DSA could be operated by another public service provider or it could be part of a private enterprise network. Subject to bilateral arrangements authorizing access, the inquiring DSA could then launch queries to the target DSA.

NADF intends that public directory services follow existing federal and state registration mechanisms when naming a directory that represents an organization or locality. NADF uses “organization,” “state,” and “place” names to designate entries in the U.S. directory, for instance. References to data about an organization will be listed in a service provider's directory at the national, state or place level of the DIT.

Residential users will be listed at the “place” level only. “These proposals can be implemented without extra layers of bureaucracy or invasive changes to the 1988 X.500 protocol architecture,” Rapport Communication's Myer says.

As an optimization for fast lookup, the names of state-level organizations may be listed as state/organization pairs at the national level. Likewise, place/organization pairs will be listed for fast lookup at the state level. (For further technical background on X.500's hierarchical information structure, see “Growing the Directory Information Tree” on page 62.)

To usher in next spring's experimental pilot, NADF members will create both real and test entries for their pieces of the direc-

(continued on page 62)

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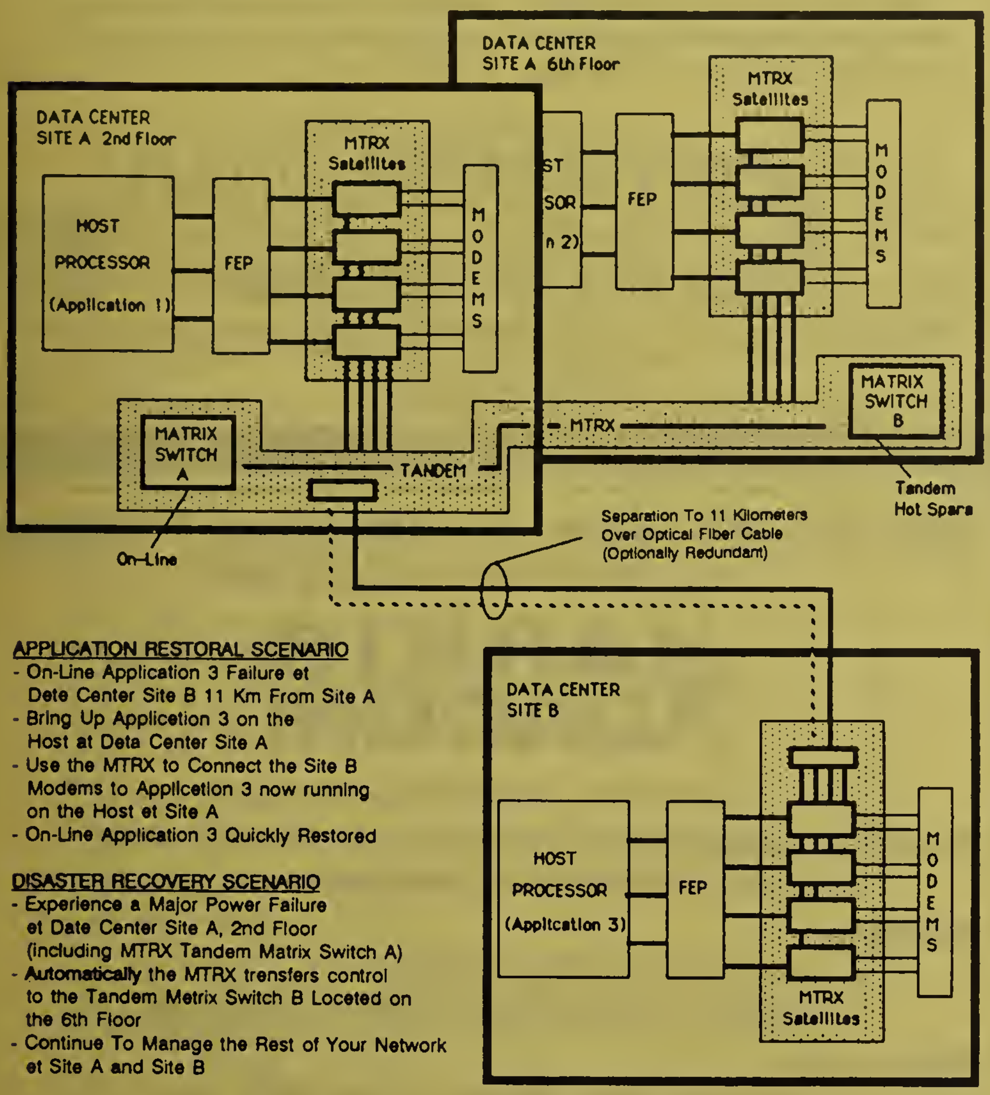
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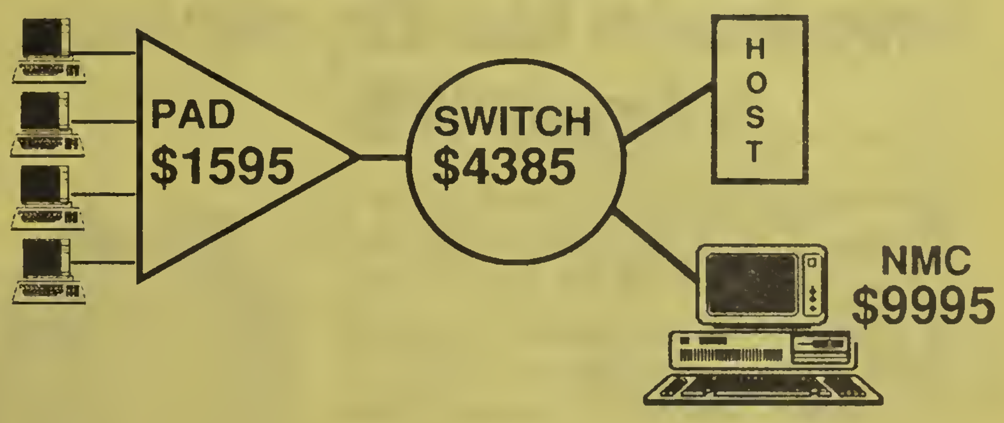

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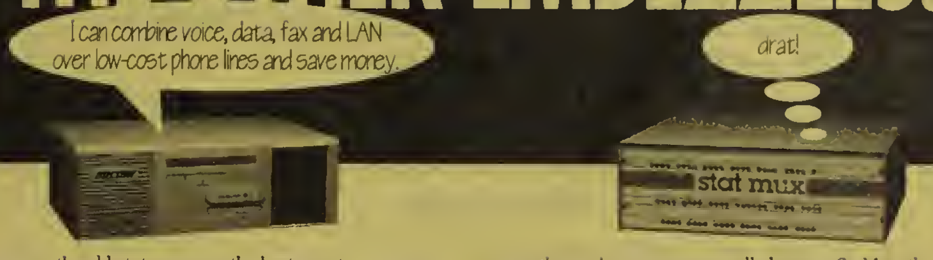
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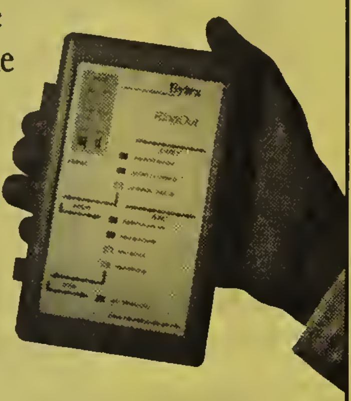

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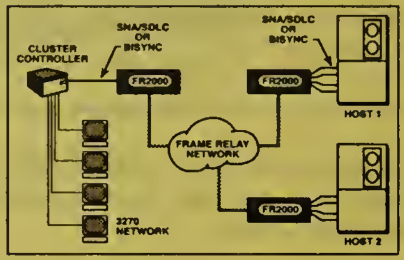

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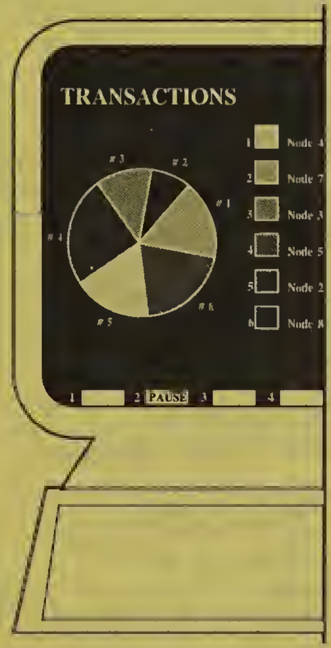

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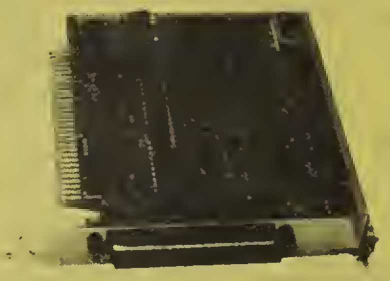

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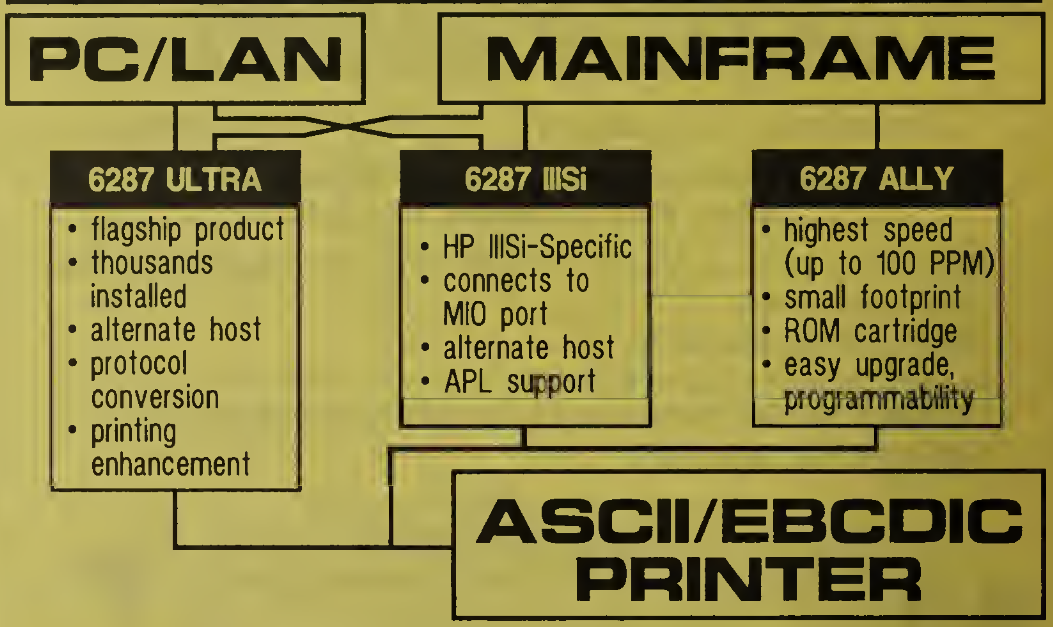

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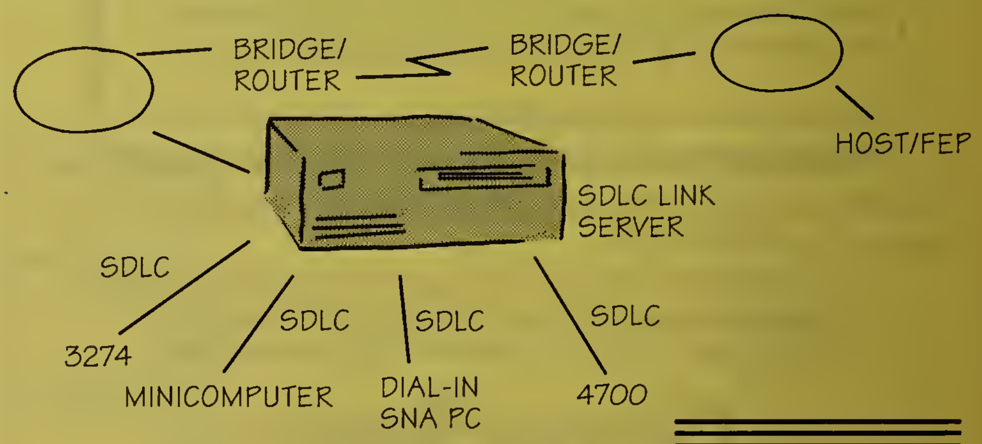

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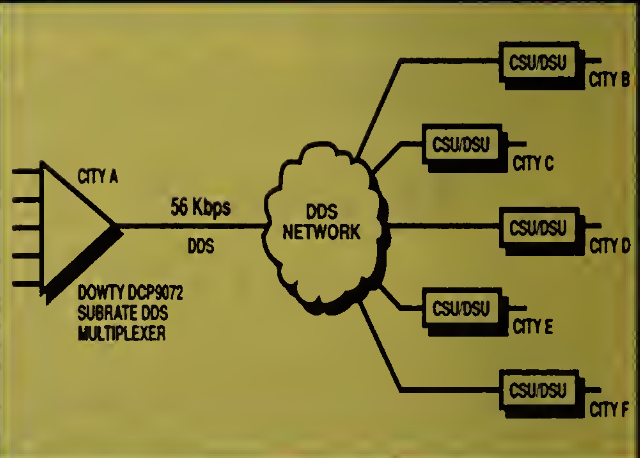

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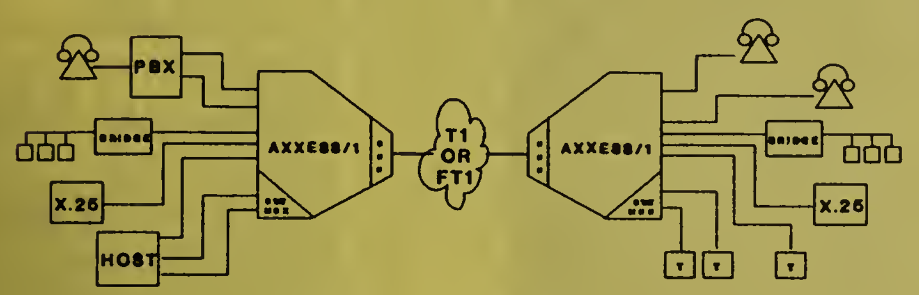

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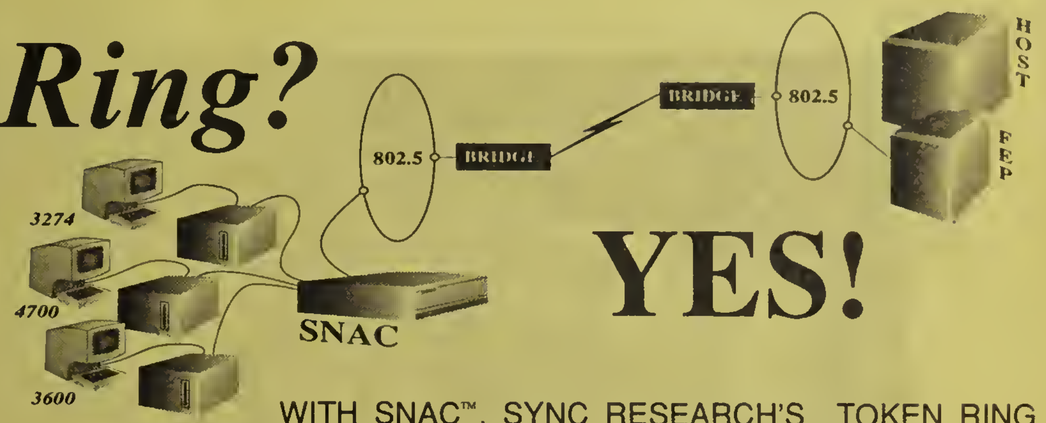

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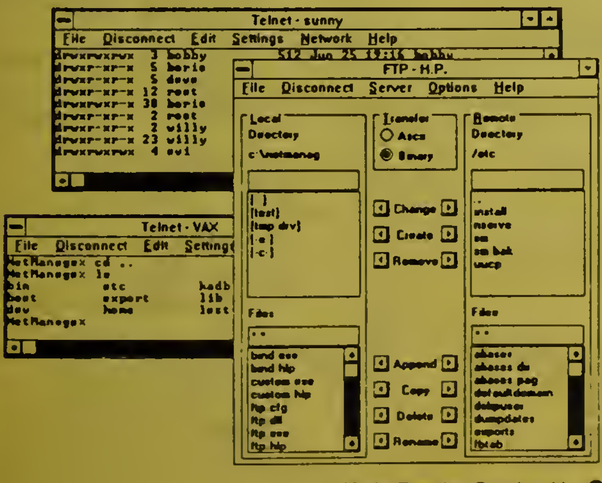

```
drwxrwxrwx  3 bobby
drwxr-xr-x  5 borie
drwxr-xr-x  5 dave
drwxr-xr-x 12 root
drwxrwxr-x 30 borie
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drwxr-xr-x  2 willy
drwxr-xr-x 23 willy
drwxrwxrwx  4 evi
```

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NetManagex ls
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```

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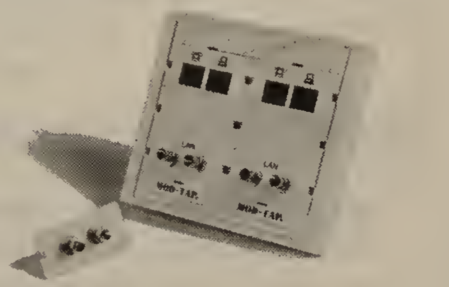

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(continued from page 52)

tory. They will then generate listings containing references to the information. NADF is developing software that will compile and consolidate individual member references into a shared reference pool. NADF will issue this software to each pilot participant. The framework for trial public directory interconnection will then be in place and can be tested using various interconnection scenarios.

Although preparing for the experimental pilot has been the major issue confronting NADF, other issues that will affect the nature of interconnection have come up. These include privacy, access control, replication of information, accounting/settlement and directory management.

NADF intends to ensure that public directory listings do not infringe on the privacy rights or expectations held by the owners of the listed information. In response to user concerns, NADF is actively developing a user "Bill of Rights" defining how and when information may be listed.

Access control is another critical directory issue. For example, a company may make the names of its network engineers available to their colleagues at remote sites but not to recruiters at search firms. Although the CCITT and ISO are still devising standard access control mechanisms for the 1992 version of X.500, NADF procedures must ensure the owner's restrictions are honored consistently when information is passed between domains. Viable access control also requires that information requestors be authenticated to each domain involved.

X.500 specifies advanced security mechanisms based on public key encryption, which can be used to authenticate users accessing potentially sensitive information in a distributed environment. Digital signature protection is available as an option to make directory requests and responses more tamperproof. However, little practical experience exists with the use of these techniques in a commercial setting.

Other issues NADF faces are planning for operation and management of the directory as well as replication of information. Information providers must deal with interdomain management issues as a whole. This involves fault, performance, accounting, security and configuration management.

Each management function is closely coupled with the unique characteristics of an X.500 public directory service. Configuration management, for example, could eventually involve the automated distribution of knowledge information between directory servers as well as stopping/starting servers and other issues. Performance management or the ability to deliver acceptable response time and availability levels is key to the success of the public directory service.

In an environment with a wide-area, multivendor, heterogeneous distributed database, response time and availability can only be improved by keeping multiple copies of directory entries at different locations. The multiple copies, however, must be consistent.

Thus, CCITT and ISO have developed protocols for automatically synchronizing multiple copies of directory entries — a technique also known as shadowing or replication. Both industry users and analysts generally agree these techniques must be implemented soon in order to minimize remote DSA accesses and thus optimize public directory performance. This will help service providers meet users' availability expectations of a public directory.

Accounting and settlement procedures are necessary before public directories can reach the commercial service phase. NADF members must agree on how to charge each other for processing information requests that cross the directories of multiple service providers.

Charges could be based on factors such as the priority of a request, the time of day it was issued, the processing time it consumed, the number of entries returned in the response or the number of characters returned.

Finally, NADF must work out issues involving interconnection of private, in-house directory services with overseas public service providers. The forum must also devise administrative and testing procedures to control the terms of entry of a carrier into the service. Given the complexity and long-term nature of the overall undertaking, NADF or a similar body is likely to exist as an organization for some time.

The promise of X.500

The rapidity with which interconnected public E-mail directories emerge globally depends on many factors, including a successful completion of CCITT/ISO's 1992 version of the X.500 standard. Public directories will eventually pave the way for highly interconnected and user-friendly messaging services.

The use of X.500 in telephony remains a long-term prospect, likely to be driven by the need to integrate telephony with successful messaging services of the future.

NADF's work offers an early test of whether collaboration among public service providers can deliver the benefits of widespread address and resource listings to support manageable open networks and value-added application services. With interconnection trials beginning next spring, current indications are that these benefits will be delivered and X.500 will move a step closer to fulfilling its promise.

Growing the Directory Information Tree

The CCITT and International Standards Organization's emerging X.500 Directory standard specifies a multivendor and interoperable distributed directory service that will enable users and applications to query and update information directories.

X.500 will enable user communities to subdivide their own directories into domains. It also defines a generic client/server architecture that lets applications running on local- and wide-area networks access directory information. Since all information is mapped into a global Directory Information Tree (DIT), any user can potentially access any other user's information.

The DIT begins at a purely conceptual root. Immediately beneath the root of this inverted tree lie countries or international organizations. Beneath a country or international organization, there may be organization units or localities. A single organization can contain multiple organization units and localities.

Generally, directory entries close to the root are branch entries, or subtrees. Further down the tree, at the leaf level, there are different classes of objects such as a person, application or device.

In the X.500 standard, countries, organizations and the other information types are described as object classes. Entries belonging to a class contain attributes such as addresses.

X.500 defines a starter set of object classes and attributes as well as object-oriented mechanisms that enable users to customize and extend these object classes and define new attributes to meet their requirements. X.500 does not standardize physical database formats. Products can be built on any database that supports X.500's logical structure.

Users access an X.500 Directory via directory user agent (DUA) software installed on their local computer. The DUA operates as a client in the client/server architecture used by X.500.

The DUA can be a standalone directory assistance program or a module of another application. This means users can manually create X.500 information requests or have an application transparently create X.500 information requests on their behalf.

The user interface to a DUA is not standardized and varies widely among products.

X.500 inquiries and updates issued by a DUA are actually resolved by groups of cooperating Directory System Agents (DSA), or directory servers. Generally, each DSA runs on a separate computer and manages a piece of an X.500 Directory.

If the DSA maintains all the information requested by a DUA query, that information will be returned to the requesting client.

If the DSA does not maintain the X.500 Directory information needed to satisfy a DUA query, the DSA will forward the query to the DSA that maintains the requested information and act as a conduit for returning the information to the appropriate DUA client.

In the case of a search requiring information from multiple directory entries, a DSA capable of supplying some of the information in a DUA query, such as a name, will use peer-to-peer communications facilities to obtain the missing information, such as an address and title, from other DSAs in the network and send that information to the client.

— *Daniel Blum*

Letters

continued from page 43

usage would drop or reliability would actually decrease.

So what can we do?

During the past decade, we have seen the reliability of computer equipment skyrocket while prices have plummeted. This did not require any government guarantees. It happened because that is what the customers wanted.

If the government keeps its hands out of the telecommunications market, then the telecommunications companies will deliver the services that customers want at prices they are willing to pay. If one company has poor reliability, word will get out and customers who want better service will go elsewhere.

We'll be much better off if the government stays out of the way and lets the free market run its course.

Roger Jenkins
Computer systems manager
(Company name withheld)
Santa Ana, Calif.

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Turning nets into computers

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ing a single process, he explains. This will reduce the dependency of each application component on the other components, providing greater flexibility and reliability.

Tools of the trade

In the traditional world of programming for a single machine, a wide range of tools is available to help developers, including subroutine libraries, APIs and computer-aided software engineering (CASE) systems.

These tools are becoming available for distributed application development. However, they have a way to go before they fully accommodate the eccentricities of distributed environments and, thereby, expand the base of programmers who will be able to build these applications.

Tools for building SQL-based distributed applications are reasonably well established. If developers have a fairly simple conception of client/server computing, they have a wide range of SQL tools from which to choose.

In addition to tools from DBMS vendors, other vendors — including GUPTA Technologies, Inc., Powersoft Corp., SmartStar Corp., SQL Solutions, Inc. and Revelation Technologies, Inc. — offer SQL development tools.

These companies "are doing their best to package SQL requests and pass them around the network," Aberdeen Group's Willmott says. "But it's left to the programmer to create the hooks and divide the code in such a way that makes distributed processing possible."

For more complex distributed applications development, there are tools to help programmers implement RPCs.

"There are lots of good things out there to build client/server applications," Burlington Coat Factory's Prince says. "RPC is intuitive to a programmer," and handling RPCs in the Unix environment is fairly well established.

However, RPC tools ease only a portion of the complex task of developing distributed applications.

"[RPC] vendors can only help you so much," according to SRA's Lorton. "You have to make new tools out of the tools they give you. You write a layer of internal tools, then you write the application."

Advanced tools

The more advanced development tools are fourth-generation languages and CASE tools. Both automate much of the software development process and promise to make development of large applications less costly.

Like most vendors, many makers of fourth-generation language and CASE tools claim they support client/server computing.

"CASE, code generators and design tools really don't support the client/server paradigm," the META Group's Zornes says. "The ones that claim to are off-loading [to the workstation] the presentation portion of applications, but [beyond that] they don't help you decide what and how much to off-load."

Rick Villars, an analyst with International Data Corp., a Framingham, Mass.-based market research firm, says, "CASE tools — tools that help [developers] design the front end — are very graphically oriented. The programming is less complex."

The challenge, he says, is connecting the presentation portion of applications to back-end computational and information management processes.

Lack of experience

The difficulties of developing distributed applications cannot be placed entirely at the feet of the tool makers. Distributed computing environments are relatively new, and standards are only beginning to emerge.

> "There are lots of good things out there to build client/server applications."
>
> ▲▲▲

The problem is a general lack of experience in working with distributed computing environments throughout the industry.

However, in the same manner that a knowledge base and a wider range of tools are now becoming available for developing client/server applications, the growing acceptance of distributed processing will make the task of developing fully distributed applications less difficult.

The question for some users is whether they will be compelled to move to distributed processing before gaining the necessary tools and experience to build applications for that environment.

A viable short-term solution is to contract systems integrators or use the system integration services of major computer vendors.

For organizations that lack personnel with experience in building distributed applications, contracting outside services could allow them to begin migrating to a distributed environment while waiting for more and better development tools to arrive. ◘

MCI weighs services for nets

continued from page 1

would be particularly useful to small and midsize companies that may not be able to afford expensive ACD equipment.

Since MCI has not priced either IRC or Network ACD, it's difficult to estimate cost savings. However, at a minimum, the services would likely allow users to cut some transmission costs by eliminating the need for dedicated lines between ACDs, analysts said.

With IRC, MCI will monitor traffic going into users' ACDs and automatically reroute calls when one site becomes overloaded, said James Zucco, senior vice-president of systems engineering at MCI. Currently, users have to do load balancing themselves over dedicated lines between ACDs.

Lawrence Bouman, senior vice-president for program management and systems planning at MCI, said the carrier is currently using IRC internally to manage customer and operator service calls and is planning to roll out the service next year. Zucco said IRC will be released as part of MCI's Integrated Network Management Service Version 3.0 in 1992.

In addition to providing more management control over customer-owned ACDs, MCI is evaluating whether there is a market need for Network ACD, Bouman said.

"Network ACD opens the ACD market to operators who couldn't afford ACD until now," he said.

The regional Bell holding companies currently provide a network-based ACD capability through Centrex, but the service is largely provided on a local basis. MCI would be the first long-distance carrier to offer ACD as a network service if it proceeds.

Bill Church, president of Call Center Solutions, a Florham Park, N.J.-based consultancy that specializes in call centers, said the service would be well suited for users that cannot afford ACDs or private branch exchanges with ACD features. The service may also be attractive to large companies that are just getting into ACD operations.

But a network-based ACD service may be less attractive for larger users with existing ACDs. "The odds of customers with stand-alone ACDs throwing out their equipment and buying 100% of [ACD] service from the network are miniscule," Church said.

A key concern for such users would be giving up control over their ACD operations, he added.

Daniel Briere, president of TeleChoice, Inc., a consultancy in Montclair, N.J., sees benefits for all types of users. Many users want to move from private lines to switched data services to link ACD centers and may move from on-site ACDs to network-based services, he said.

That's particularly true for users with international operations. The service could be a viable alternative to housing ACDs in every country served.

Mark Langer, also with TeleChoice, said a network-based ACD service could provide billing and network management reports consolidated with information about other services.

Gordon McPherson, president of the Incoming Calls Management Institute in Annapolis, Md., said a network-based ACD service could be a big plus for companies that use at-home agents.

J.C. Penney Company, Inc. has been a pioneer in this area, using agents at home to handle catalog orders and customer service inquiries as well as other types of calls.

"[Network ACD] would be a quantum leap for at-home agents," McPherson said. "To have geography-transparent ACD has tremendous potential."

Many companies that have large call centers find that they quickly deplete the pool of local qualified labor and are forced to set up another ACD in some other location, McPherson said. Network-based ACD would instead allow the companies to pick up agents from anywhere in the country. ◘

MCI gains edge with intelligent net

WASHINGTON, D.C. — MCI Communications Corp. will exploit the intelligence and software capabilities built into its network to speed the rollout of advanced network services and customized features, officials of the carrier said last week.

Top MCI executives said that since the carrier was formed in 1969, it has been playing catch-up with competitors. MCI has spent $8 billion to build an intelligent, integrated network and is now positioned for a leadership role in the delivery of customized and advanced net services, they said.

Among the offerings planned is an array of new public network-based data services. The carrier already offers switched T-1 and T-3 through digital access and cross-connect systems (DACS) in its network.

MCI is also testing and plans to begin installing new cell-based packet switches from Siemens Stromberg-Carlson, dubbed the Metropolitan Area Network Switching System (MSS), including support for a range of advanced data services, such as Switched Multimegabit Data Service (SMDS) and Asynchronous Transfer Mode (ATM).

Although MCI has not announced that it will roll out either service, it is planning to conduct long-distance SMDS trials with two local carriers.

Siemens is also building a frame relay interface for the MSS switch to support a frame relay service, which MCI said will become commercially available in the second quarter of next year.

Richard Liebhaber, executive vice-president and group executive at MCI, said the firm is focusing on a cell-based platform so that it can evolve new services for voice and data as markets develop. He said that AT&T has about 96% of the private-line market in the U.S., so MCI is moving toward virtual services.

"We wanted to eliminate the need for private lines," Liebhaber said.

He sees the ultimate future of networking revolving around the high-speed switched data services, such as SDMS and ATM. Frame relay, which is based on private virtual circuits, is not technically considered to be a switched data service, he said, and MCI views frame relay as a somewhat peripheral offering.

"We view frame relay as an interim product," Liebhaber said. "It serves a need and fills a requirement [now]," he said.

In addition to supporting new services, MCI officials said the company's intelligent network allows for more rapid rollout of offerings. For example, MCI's hottest residential discount program, dubbed Friends and Family, was conceived and rolled out in three months, according to James Zucco, MCI senior vice-president of systems engineering. That plan gives callers a 20% discount when they call other customers enrolled in the program. It has reportedly yielded about 3 million new customers for MCI.

The carrier also developed in three months a new feature for the Social Security Administration that intercepts calls and routes them to the appropriate location, said Lawrence Bouman, MCI's senior vice-president for program management and systems planning.

MCI officials said they believe they can roll out similar customized services in the same time frames in the future. Industry analysts said it typically takes at least a year for a carrier to roll out a new service from conception to commercial availability.

— *Anita Taff*

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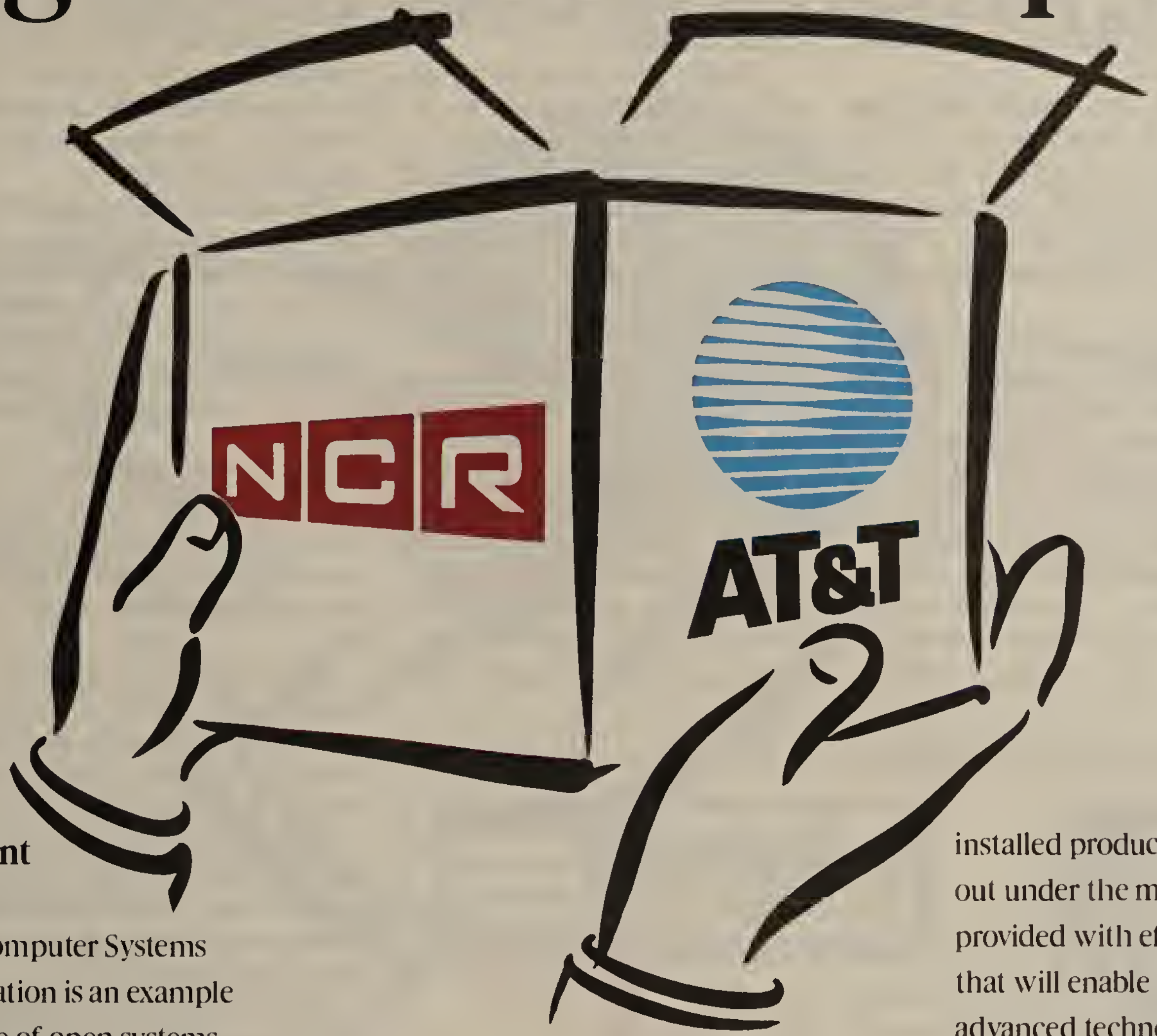

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> *"This alliance should bring them into a market leadership position in the next 12 to 18 months. There's an unbelievable number of potential synergies between them, especially considering AT&T's expertise in telecommunications."*
>
> *—Chris Christiansen, The Meta Group*

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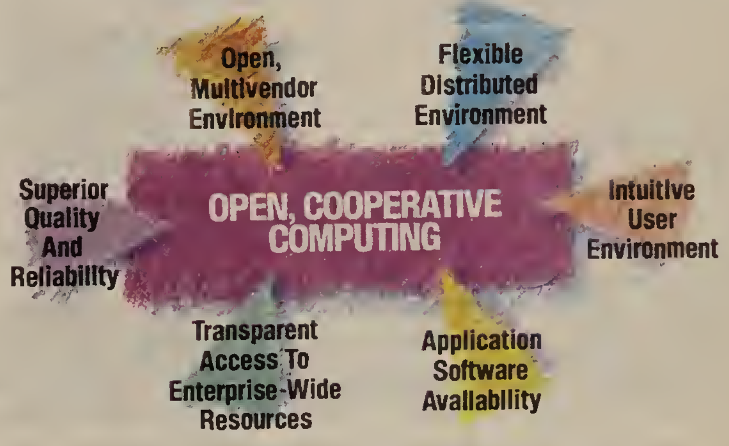
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The Strategy For Managing Change.

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Client/server pays off

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lored to the user's job function, a feat the company accomplished in tandem with a revamping of business processes. The strategy has improved productivity about 30% overall — a major contributing factor to the project's expected $4 million annual return on investment.

"The challenge was to reengineer the business and save the current application portfolio," said Dave Semeraro, vice-president in charge of business solutions at Connecticut Mutual.

Over the years, Connecticut Mutual added applications, mostly host-based, to address various vertical business needs, such as when a new offering was added to the company's product portfolio. Currently, the company offers various flavors of life insurance, mutual funds, annuities, stocks and other offerings, each supported by its own applications.

Most applications run under CICS on the company's IBM Enterprise System/9000 Model 21 mainframe. said Dave Hugh, senior network analyst for Connecticut Mutual. Traditionally, the applications were accessed via dumb terminals, although the firm has been gradually replacing them with personal computers.

Among the problems the company faced was the difficulty of sharing information among applications. For example, a customer with five different policies would have five sets of records, each of which was treated separately, said Janice Scites, chief administrative officer for the individual line at the company.

"There was no way for us to look at the client as a whole," she said. "You had to log on and off a whole series of systèms, or the customer had to be transferred to another department."

To solve that problem, the company installed IBM's DB2 relational database management system, which enables the company to identify all records pertaining to a particular customer. The Command Center gives users easy access to those records and other data, such as image-based files, from a single workstation.

The company began building a DB2-based customer database about 18 months ago in an effort to provide the consolidated view of a customer's records, Semeraro said. Now when a change is required on one policy and needs to be replicated on the others, it will happen automatically.

"One transaction may kick off 28 CICS transactions," said Roger Thibodeau, assistant vice-president at Connecticut Mutual. "We haven't replaced our mainframe systems; we've added power to them."

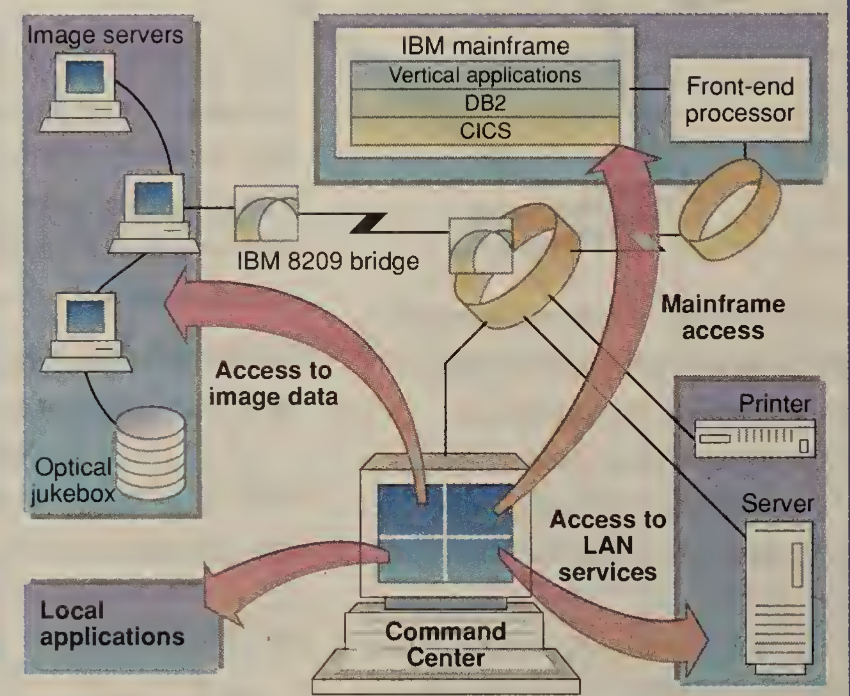
Connecticut Mutual's workstations are IBM PS/2s attached to a series of 4M bit/sec token-ring local-area networks located throughout two buildings here. Some 25 PS/2s running the IBM Token-Ring Bridge Program link the LANs to two token ring-attached front-end processors, Hugh said.

Each PS/2 workstation runs DOS 5.0, Windows 3.0, Attachmate Corp.'s EXTRA! for Windows 3.2 3270 emulation software and FileNet Corp.'s WorkForce client software, Thibodeau said.

Through careful engineering, attention to memory management and with help from the various vendors involved, the company succeeded in building its Command Center in just about a year. The results are dramatic.

Now when a customer is on the telephone, a customer service representative can access records for all the customer's holdings with the company, compute a total cash value and print out a consolidated statement.

Connecticut Mutual lets PC take command



Connecticut Mutual's Command Center gives end users easy access to mainframe applications, image data, LAN services and local applications, while tailoring presentation of the data to specific job requirements.

SOURCE: CONNECTICUT MUTUAL LIFE INSURANCE CO., HARTFORD, CONN.

GRAPHIC BY SUSAN J. CHAMPENEY

"That used to take days to do," Scites said. "If you imagine all the people and paper involved in accomplishing those tasks, it's pretty mind-boggling. It's as much as a 50% productivity gain."

In addition to providing a common view of data, DB2 also figures prominently in the FileNet imaging system. FileNet employs a handful of Unix-based servers running on an Ethernet LAN bridged to the token-ring complex via an IBM 8209 LAN bridge (see graphic, this page).

Separate servers handle such tasks as document scanning, optical storage and retrieval, work distribution and indexing.

Any time a query is made on a customer account, DB2 not only gathers mainframe-based records, but also provides information on any associated image documents, such as customer inquiry letters, which can then be retrieved from the FileNet servers.

Such features have produced dramatic productivity gains.

For example, Scites said it used to take about 21 days to process a death claim due to all the data that had to be gathered from various sources.

"Now it's four to six days," she said. "It takes seconds to do things that used to take a day."

But the productivity gains did not come from technology alone.

"What you have to do is reengineer the business," Semeraro said. "That means looking at what you should be doing and immediately cutting out the things that have clogged up the pipes over the years."

In one business area, for example, Connecticut Mutual had separate jobs focused on data collection and entry, managing the flow of paper documents to underwriters and handling telephone inquiries from agents. The advent of imaging eliminated the paper flow because all documents were scanned into the system, which meant those two jobs could be combined into one.

The Command Center project cost the company some $6.5 million in equipment, mostly for the FileNet system and about 300 PS/2s. That investment will pay for itself in two years, Scites said.

After that, the rate of return is more than $4 million per year, Semeraro said. "The return on investment is the highest we've ever projected," he said.

Scites said the Command Center gives her company about a 24-month lead time on its competitors, which she attributes to the team concept the firm has adopted among its technology and business staff. In fact, Connecticut Mutual even lets competitors come in for Command Center demonstrations.

"They can look at it all they want, but they've still got to do it," she said. "We watch other companies stumble because they can't get themselves to focus on common goals and agree."

WilTel to enter switched mart

continued from page 2

ing to AT&T Tariff 12 deals. With the acquisition, which will cost $50 million to $60 million, WilTel hopes to be able to market custom net arrangements as aggressively as its rivals.

The deal would complete WilTel's transformation from a regional carrier reselling capacity to other carriers to a nationwide service provider with offerings ranging from basic long distance to T-3 45M bit/sec digital facilities.

WilTel currently offers 64K bit/sec, fractional T-1, T-1, fractional T-3, T-3, bandwidth-on-demand services and the industry's first available frame relay service.

The acquisition of Telesphere would enable WilTel to provide an array of nationwide switched services, including direct distance dial, WATS, 800, international and travel card services — offerings that will help it better compete with rivals AT&T, MCI Communications Corp. and US Sprint Communications Co.

If the acquisition is approved, WilTel would merge the switched net with the regional and international switched networks of its Vyvx, Inc. and Telesphere's International TeleCharge, Inc. (ITI) subsidiaries.

Vyvx provides services here and in Houston using Northern Telecom, Inc. switches, while Telesphere operates a network that uses fiber links leased from WilTel and switches from Digital Switch Corp. in Atlanta, Chicago, Dallas, Los Angeles, New York, San Francisco, Orlando, Fla., and Philadelphia. ITI operates international gateway nodes — Northern Telecom switches — in four of the same cities as WilTel in addition to Cleveland.

Analysts said WilTel had no choice but to enter the switched voice services market and said acquiring Telesphere would be a logical first step.

"With switched data and virtual network services shrinking demand for private lines, WilTel has to get into the switched voice services market if it wants to remain competitive," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy.

But even with Telesphere's switched voice offerings, WilTel will still lack a virtual service. "They'll need to come out with a feature-rich virtual network service as soon as possible if they are serious about competing for users with multiple locations," Briere said.

Current WilTel customers expressed interest in the carrier's switched service plans but said they hope that efforts to offer new services do not detract from the private-line services.

"WilTel is free to come in and pitch us any new service, but we want them to continue their focus on doing a superior job with private lines," said Ken Starkey, associate communications director at Bear, Stearns & Company, Inc. "We realize switched voice services will be more profitable for them, but we don't want to ruin a good thing."

OMG unveils key application tool

continued from page 6

ed systems. The network would grind to a halt," said Tom Willmott, vice-president of Aberdeen Group, Inc. in Boston. "Now there's technology on the table that's significantly important to the development of distributed applications and client/server systems."

Although the broker is hailed as the vanguard of distributed computing, the technology was gleaned from products already being shipped by OMG members.

For example, DEC's contribution to the broker is based on the company's Application Control Architecture (ACA) Services software, which is available on VMS and Ultrix systems. ACA Services, a component of DEC's Network Applications Services software suite, is an object-based package for building and integrating applications in a mixed platform environment.

HP and SunSoft, the software subsidiary of Sun Microsystems, Inc., jointly submitted the distributed object management facility (DOMF). DOMF, which is said to allow the creation and management of objects independent of the operating system, network or RPC mechanism, is a compilation of HP's NewWave and Network Computing System (NCS) technology, as well as Sun's Open Network Computing (ONC) product set.

NewWave, which has been on the market for more than two years, is HP's object-oriented application environment. NCS and ONC are HP's and Sun's respective distributed computing protocols.

NCR contributed "product knowledge and comment" on its Cooperation office automation software, rather than a specific piece of the technology, said Jim Walker, NCR's general manager of cooperative computing. Cooperation, which debuted about a year ago, is based on HP's NewWave.

Object Design, a developer of an object-oriented database management system, also contributed insight into the interaction of the broker with distributed object-oriented databases.

HyperDesk was the only vendor that submitted technology still in the laboratory. Its distributed object management system is expected to ship in January.

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Users herald applications

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1992, Adkisson said.

Mail-enabled applications have also taken hold at Continental Grain Co., according to Bill Klauk, communications operations manager at the New York-based agricultural products supplier.

One of the tasks of Continental Grain's futures group is to submit a weekly report to the government detailing the company's cash position — a standard process that ensures the government that the company is not speculating in the commodity grain business, he said.

Continental Grain has automated the reporting of its cash position to the government via E-mail, Klauk said.

Under this setup, reports from the company's regional offices are automatically sent via E-mail to a mailbox on Continental Grain's H&W Computer Systems, Inc. SYSM mail system, he said.

The company's futures group then relays the messages into a database that determines its overall cash position and automatically sends out discrepancy and analysis reports to the appropriate regional reporting offices, he added.

In the past, Continental Grain's reporting offices would submit the reports, which would then be manually compiled on spreadsheets to determine the company's overall cash position, according to Klauk.

This process, which involved contacting offices that made mistakes or failed to submit reports, would take two senior clerks three days to complete. It also forced the company to petition the government for a permanent extension to the weekly deadline, he said.

By integrating the application of reporting the company's cash position with E-mail, the business process has been cut to one day, Klauk added.

Liberty Mutual

Mail-enabled applications are often used to automate certain business processes, as Liberty Mutual Insurance Group has done with the synchronization of its E-mail directories.

According to Patrick O'Connor, information systems consultant at Liberty Mutual in Portsmouth, N.H., his company early this year implemented a mail-enabled application to automate its E-mail directory synchronization processes.

Libery Mutual supports a central E-mail directory on an IBM 3090 mainframe running Soft-Switch, Inc. E-mail software that is at the center of a mixed E-mail environment that includes Lotus Development Corp.'s cc:Mail's local-area network E-mail system, Digital Equipment Corp.'s All-In-1 and Microsoft Corp.'s MS Mail.

The central directory is accessed by E-mail administrators throughout the day to make adds, deletions and changes related to listings of E-mail users on the network. At the end of the day, the mainframe kicks off a batch job that bundles all the modifications and automatically distributes them via E-mail to the other directories across the network.

"Directory synchronization is an intensive administrative task," O'Connor said. "By mail enabling this process, we cut out much of the manual process and remove human error as much as possible."

Mail-enabled applications gain interest

NEW ORLEANS — A major topic of interest at the Electronic Mail Association's Electronic Messaging '91 conference here last week was the use of so-called mail-enabled applications.

Although definitions of mail-enabled applications vary slightly, users and vendors generally agree these applications basically rely on E-mail to communicate data to persons or other applications within a company to trigger a response.

Electronic data interchange, the routing and approval of reports, and database queries are just a few examples of mail-enabled applications.

Jef Graham, general manager of Hewlett-Packard Co.'s Pinewood Information Systems Division, said mail-enabled applications go beyond traditional person-to-person messaging. Typically, he said, mail-enabled applications involve the exchange of E-mail between business applications or between a business application and a person.

Mail-enabled applications fall into two general categories, according to David Atlas, product marketing manager for Beyond, Inc., a Cambridge, Mass.-based E-mail software developer.

First, E-mail can be embedded into an application, such as a spreadsheet, so a user can send E-mail from within the application. In this case, E-mail would be listed on a menu as one of numerous services, such as printing and file services, he said.

A user could select the E-mail option to send a copy of a spreadsheet to another user via E-mail without ever leaving the spreadsheet application, he said.

Another form of mail-enabled applications is the emerging set of groupware, work flow automation and filtering applications, Atlas said.

"In both of these examples, mail is simply the mode of transport for the applications," he said.

A slew of new companies, such as Beyond, Clarity Software and Reach Software Corp., have emerged to address the mail-enabled applications market. Established vendors, including HP and IBM, are also focusing on this market.

Adam Scroczynski, president of host-based E-mail software maker Verimation, Inc., said mail-enabled applications may be best defined by what they are not.

"Mail-enabled applications involve the use of E-mail for purposes other than interpersonal messaging," he said.

— *Bob Brown*

TI to market homegrown EDI

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partner. The translator does this by dynamically uploading a series of rules from host databases that instruct it how to format incoming or outgoing transmissions.

These rules are preestablished in host databases using TI's Workbench mapping software and its EDI Management System, which records trading partner profiles.

The translator also uses artificial intelligence to detect errors in addresses. syntax or fields of an EDI message. But rather than drop an entire transmission once an error is spotted. as many translators do, TI's offering sends all but the faulty document.

TI's mapping facility is a Microsoft Corp. Windows-based application that EDI personnel can use to record how EDI data is to be mapped into a user's application as well as agreed-upon conventions that describe how two trading partners will use a specific EDI document format.

The Management System is a host-based tool that records all trading partner information, such as what EDI document version, communications protocol and value-added network each trading partner is using. It also stores billing information and names of trading partners' EDI personnel, among other things.

TI's test facility enables users to test transmissions to new trading partners to spot errors. Unlike other test products, TI's test facility will record all errors in a given transmission instead of just the first two or three errors that occur. This speeds up the process of troubleshooting new trading partner transmissions.

The gateway product costs $100,000 and is available now. The translation software, test facility, Workbench and Management System come as a single package, which is available now at a price of $100,000.

For more information, call Shoquist at (214) 575-2485.

Proteon off-loads to interfaces

continued from page 2

move protocol processing, net management and applications such as 3270 services from a DOS workstation onto the adapter, many of the modules supporting that effort will not be available for three months to a year.

Some token-ring adapter companies such as Digital Communications Associates, Inc. and Madge Networks, Inc. offer intelligent token-ring boards, but neither has off-loaded network processes to their adapters to the extent Proteon proposes. Both firms said they intend to offer the same functionality as Proteon.

"Proteon is clearly addressing the current limitations of adapters," said Charles Robbins, director of communications research at Aberdeen Group, Inc., a Boston consultancy. "I expect other vendors will soon follow suit." Robbins said ASA will help network managers open up their local-area network-based workstations to better accommodate the demands of emerging network applications.

"The new architecture addresses many of the issues that a distributed computing environment brings to the floor. In a client/server environment, the client will become increasingly overwhelmed if tasks are not distributed to other vehicles," Robbins said.

Under the ASA banner, Proteon announced RapidPacket, device driver software that will support 16M bit/sec transmission of small 64-byte packets to support emerging network applications. The company's current ProNet-4/16 RapiDriver device driver supports 64-byte packets at 4M bit/sec transmission rates.

Proteon also announced software that enables IBM's Network Basic I/O System and The Santa Cruz Operation, Inc. Unix protocols to travel over 16M bit/sec token rings.

The two enhancements will be offered as a free software upgrade and will be available in the first quarter of next year.

Network services scheduled to be migrated from the workstation onto the adapter include protocol processing of IBM's NETBIOS/Logical Link Control (LLC), Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX). Processing multiple protocol stacks consumes a substantial amount of the 640K-byte DOS memory in a host workstation. Off-loading the task to the adapter will improve overall network throughput.

> "Proteon is clearly addressing the current limitations of adapters," said Robbins.
>
> ▲▲▲

The NETBIOS/LLC protocol will be included on the adapter by the second quarter of 1992. The IPX/SPX protocol will be available in the second half of next year. Pricing for both have not yet been determined.

ASA will also include network management support directly on the token-ring board. It will include support for an on-board Simple Network Management Protocol (SNMP) agent that will provide information from standard management information bases to any SNMP manager. The SNMP agent will be available by early next year. Pricing has not been set.

Also included as part of ProNet-4/16 ASA is a Common Management Information Protocol over LLC (CMOL) management agent. The CMOL agent will provide all the functionality of the SNMP agent and full compatibility with IBM LAN Network Manager. The CMOL agent will be available in the second half of 1992. Pricing has not been set.

Aberdeen's Robbins said ASA's modular design will also significantly reduce software development time. By splitting the functions — such as operating systems interfaces, applications, network interfaces and adapter platforms — into separate modules, ASA will also speed delivery of third-party support for emerging network operating systems.

When new features are introduced in a network operating system — such as a new release of Novell's NetWare, for instance — device drivers in the workstation must be changed. With ASA, changes can be made to one module and all the device drivers for the operating system are updated simultaneously. The end user can perform the software enhancement simply by copying a new file onto a workstation.

"Proteon is addressing a growing user requirement. Users have been asking for more intelligent and flexible adapters to support their growing networks as well as the more sophisticated applications they're putting onto those nets," Robbins said.

Bill to revamp IS draws ire

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Stevens said. "In fiscal year 1990, direct appropriations accounted for less than 4% of the total budget — about $274 million of the $8 billion total."

He said the GSA clearly requires greater oversight but stopped short of endorsing Conyers' proposal to strip the GSA of its procurement authority.

Sen. John Glenn (D-Ohio), chairman of the Senate Governmental Affairs Committee, said he was astonished to learn that the GSA charges federal agencies a 10% overhead fee when processing their FTS 2000 orders.

He pointed out that the GSA now makes $17 million annually off FTS 2000 and has 277 employees overseeing the contract. Glenn said a review of that overhead is being conducted. He emphasized that he supports the Conyers' bill and plans to introduce companion legislation in the Senate in about two weeks.

The GSA did voice support for one clause in the bill that would require all agencies to use FTS 2000 as their long-distance service. Congress has tacked FTS 2000 mandatory use language onto yearly appropriations bills since 1988, but H.R. 3160 would make that requirement law.

MCI Communications Corp. issued a statement blasting the provision. "Mandatory use has become the primary obstacle to maintaining prices at or below market rates," the carrier said.

The mandatory use clause will put further pressure on the Department of Defense and other governmental bodies, including Congress, to use FTS 2000, Conyers said. ◘

Carrier pushes FTS 2000

WASHINGTON, D.C. — US Sprint Communications Co. is pressuring a reluctant Federal Reserve System to join Federal Telecommunications System (FTS) 2000, a battle whose outcome will have wide-ranging impact on future network and computer purchases at the Fed.

In protests filed at the General Services Administration Board of Contract Appeals, US Sprint has asked the GSA appeals board to rule by mid-November whether the Federal Reserve is a federal agency or a private-sector organization.

If the GSA finds the Federal Reserve is a government agency, consequent decisions are likely to force the organization to abandon its private-sector buying practices in lieu of the more restrictive government procurement rules.

Consequently, the Federal Reserve would not only have to purchase US Sprint's FTS 2000 services, but all of its property and automated data processing procurements would be subject to complex government rules and contentious protests by losing vendors.

The Federal Reserve can appeal any GSA board decision to the Federal Circuit Court of Appeals.

The battle with US Sprint threatens to scuttle the Federal Reserve's plans for a new data network dubbed Fednet, said a spokesman for the Federal Reserve Bank of Boston.

The Boston bank is carrying out the Fednet procurement on behalf of the entire Federal Reserve, which includes the Washington, D.C.-based Federal Reserve Board and 11 other regional banks in the U.S.

Fednet, planned as a network that would enable all parts of the Federal Reserve to share data, will be issued as a request for procurement early next year, the spokesman said.

He emphasized that the entire Federal Reserve is united in its position that it is not a federal agency and never has been.

But George Affe, an attorney with US Sprint's government services division, pointed out that the Federal Reserve was assigned as a US Sprint customer by the GSA back in 1988, when the FTS 2000 contract was awarded. The carrier has since tried to win the Federal Reserve's business but to no avail, he said.

Until Sept. 30 of this year, a GSA rule exempted agencies with existing contracts from having to migrate to FTS 2000.

After the expiration of this exemption, US Sprint decided to press its case for the Federal Reserve's business by initiating the filing process at the GSA appeals board.

In particular, US Sprint is protesting two long-distance voice and data RFPs issued last summer by the Federal Reserve Bank of Atlanta.

The Atlanta bank has asked the GSA board to dismiss the protests for lack of jurisdiction. In its defence, the Atlanta bank acknowledged US Sprint's actions have it worried, noting: "This case raises vital issues for the Federal Reserve Bank of Atlanta and the 11 other Reserve banks because the outcome of this case could effect the historic private nature of Reserve banks."

A spokesman for the Atlanta bank said it had used the old FTS several years ago but abandoned it long before FTS 2000 was awarded.

—Ellen Messmer

User replaces Cray XMP

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Brooks, project leader for the massively parallel computing initiative at Livermore Lab.

"The RS/6000 is what we call a 'killer micro,' " Brooks said. He noted that servers like the IBM machines can outperform the Cray in certain applications, such as evaluating the shielding strength of a nuclear reactor.

Due to the nature of the code in these applications, the RS/6000s "can — CPU-to-CPU — beat the latest supercomputer in performance," Brooks said.

Livermore Lab, which is one of the Department of Energy's largest research labs, will use the networked server cluster to support its compute-intensive research, including such diverse applications as calculating the motion of a supernova and performing weather simulations.

Because IBM does not yet offer a Fiber Distributed Data Interface adapter for its RS/6000, Livermore Lab will initially link the 14 devices via a thin-wire Ethernet local-area network, Brooks said. IBM has committed to providing FDDI capability soon, although it declined to discuss availability.

"IBM is contractually committed to providing FDDI capability as part of the sale," Brooks said.

The RS/6000s will run the AIX Version 3 operating system, IBM's version of Unix. In addition to the 2.9G bytes of combined memory, the Unix Compute Server will offer 26.7G bytes of distributed disk space.

Tied into the Ethernet with the RS/6000s is a Sun Microsystems, Inc. SPARCstation that acts as an interface to a tape jukebox system for storage. It also handles management tasks such as monitoring passwords and keeping track of critical system files. According to Brooks, the SPARCstation runs internally developed software to perform those functions, and this software will eventually be ported to the RS/6000s.

The RS/6000s will support an average of 50 concurrent users working at terminals or Sun workstations running the X Window System. When a user logs on to the network, the client workstation displays a table showing the least busy processor (see graphic, page 1). This information is gathered by software on the RS/6000s, which constantly polls the servers. Utilization statistics are relayed to X Window clients, so users can log on to the server that will give them the best performance.

The user can then issue a command from the workstation and initiate a session with the least active RS/6000. According to Brooks, Livermore Lab will eventually integrate a task broker into the network that will automatically route a user request to the least busy device in the cluster.

Using Sun's Network File System (NFS), and eventually the Andrew File System, the RS/6000s will access the user files, wherever they are located in the cluster. Livermore Lab wants to move to the Andrew File System because it accesses user files wherever they are and relocates them to the local RS/6000, speeding performance.

NFS does not have this capability and must continue to search the network for the file each time it is needed. Because IBM does not yet support the Andrew File System on its RS/6000s, Brooks said Livermore Lab will not be able to incorporate it right away. He added that it should be available about the same time as the FDDI capability.

One module at a time

Price/performance turned out to be the overriding factor in Livermore Lab's decision to go with the IBM networked server cluster, Brooks said.

"The RS/6000s support the necessary floating point-intensive calculations," he said. "We created a competitive bid based on performance, memory, disk capacity, single CPU performance and aggregate throughput, and we chose the IBM bid because it offered the lowest price that satisfied our requirements."

Those requirements included a list of application processing benchmarks that Livermore Lab devised and required the vendors to test against their proposed configurations. Brooks declined to comment on the other bidders for the project.

Brooks said Livermore Lab has set an agressive timetable in which to get the new network up and running. Livermore Lab has received two RS/6000s, and full delivery of the remaining 12 computers is expected shortly.

Once all are delivered, Brooks said it will not take more than a couple of weeks to get the net out of the beta stage and operational. ◘

HP, IBM unwrap E-mail tools

continued from page 4

works. Because the directory is distributed, users will be able to access addresses from local servers rather than from a single centralized directory, Johansson said.

Integrating OpenMail

HP also said it has integrated its OpenMail product with the X.500 software, thus giving OpenMail users access to the distributed directory. OpenMail provides the E-mail services under HP NewWave Office.

Also, HP will work with Touch to give users of LAN-based E-mail systems access to HP's X.500 Distributed Directory services.

HP's X.500 Distributed Directory, which will run on the HP 9000 Series 800, is expected to be priced from $5,000 to $40,000, depending upon configuration.

IBM announced several enhancements to the IBM Mail Exchange, a service of the IBM Information Network that provides connectivity between users' E-mail systems.

Users can now exchange binary files, computer-generated images and other atypical messages between X.400 nets and various proprietary E-mail systems, said Nick Dixon, E-mail worldwide product manager for the IBM Information Network. Previously, IBM only allowed users to send such files between the same proprietary systems, he said.

IBM also enhanced its directory services to allow individual users to create unique directory entries for people with whom they regularly communicate, doing away with bulky X.400 addresses, Dixon said. The IBM Information Network will handle translation from these so-called X.400 aliases to the full X.400 address.

IBM has also enabled users to close off X.400 access to their networks for all but specified message senders. ◘

NETWORK WORLD

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TCP/IP, MacTCP and IPTalk support	■	■
DECnet Phase IV support	■	■
AppleTalk Phase 1 and 2 support	■	■
Thin, thick or 10BaseT Ethernet	■	■
Configuration, monitoring and upgrades from anywhere on network	■	■
SNMP and atalkad support	■	■
Seed, non-seed and soft-seed routing	■	
AppleTalk tunneling over IP backbone	■	
Remote gateway status via *telnet*	■	
Out-of-band hardware diagnostics	■	
Diagnostics written to UNIX *syslog* file	■	
2 MB memory	■	
Optional AppleShare-NFS file sharing	■	
Optional UNIX-AppleTalk printing	■	
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